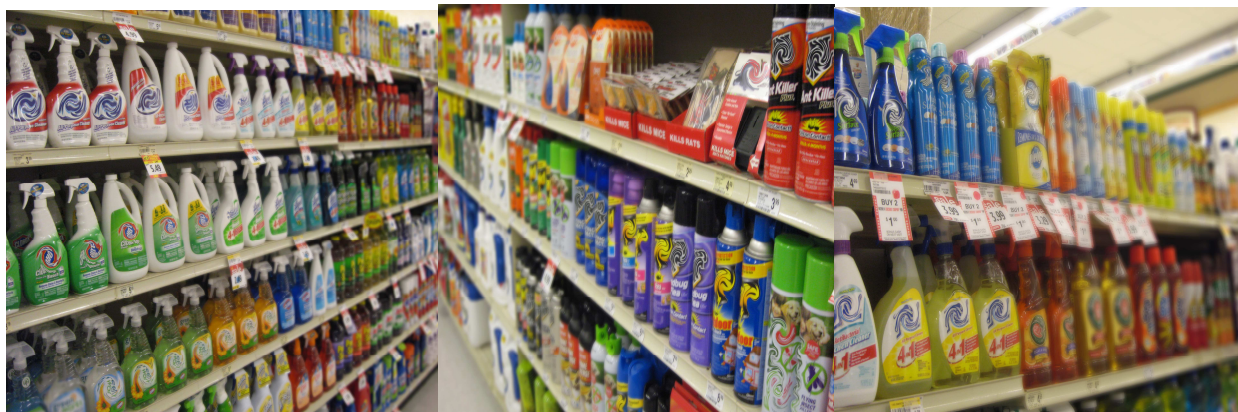


California Environmental Protection Agency



Initial Statement of Reasons

Proposed Amendments to the California Regulation for Reducing Emissions from Consumer Products and Test Method 310: Determination of Volatile Organic Compounds in Consumer Products and Reactive Organic Compounds in Aerosol Coating Products



Release Date: September 29, 2010

**State of California
AIR RESOURCES BOARD**

Initial Statement of Reasons

**Proposed Amendments to the
California Regulation for Reducing Emissions from
Consumer Products**

and

**Test Method 310: “Determination of Volatile Organic Compounds
in Consumer Products and Reactive Organic Compounds in
Aerosol Coating Products”**

**To be considered by the Air Resources Board at a
Public Hearing on November 18, 2010, at:**

**Byron Sher Auditorium
Air Resources Board, Cal/EPA Headquarters
1001 I Street
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**P.O. Box 2815
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September 29, 2010

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Table of Contents

Executive Summary	1
A. Authority to Regulate Consumer Products.....	2
B. Existing Regulations	2
C. Regulatory Development Process.....	2
D. Basis for the Proposal and VOC Emissions	3
E. Consumer Product VOC Emission Reduction Commitments in the State Implementation Plan (SIP)	4
F. Summary of Proposed Amendments to the Consumer Products Regulation....	4
1. Definitions (section 94508).....	5
2. Proposed Amendments to Standards for Consumer Products (section 94509)	5
3. Proposed Amendments to Administrative Requirements (section 94512)	9
G. Proposed Amendments to Test Method 310.....	9
H. Compliance with the Proposed Amendments	10
I. Economic Impacts.....	12
1. Overall Cost	12
2. Cost-effectiveness	12
3. Return on Owner's Equity (ROE)	12
4. Impacts on California Businesses	13
5. Increased Cost to Consumers.....	13
6. Fiscal Impacts	13
J. Environmental Impacts	13
1. Prohibition on Use of Certain Toxic Air Contaminants	14
2. Limit on Use of Global Warming Compounds	14
3. Prohibition on Use of Alkylphenol Ethoxylate Surfactants.....	15
K. Environmental Justice.....	15
L. Future Plans.....	15
M. Recommendation.....	16
 Chapter I. Introduction	 1
A. Enabling Legislation.....	2
1. Health and Safety Code section 41712.....	2
2. Health and Safety Code section 38500 <i>et seq.</i>	2
3. Public Resources Code section 21000 <i>et seq.</i>	3
B. Background.....	3
1. Existing Consumer Product Regulations.....	3
2. Consumer Products and the State Strategy for California's 2007 State Implementation Plan (SIP)	4
3. Consumer Products and the California Global Warming Solutions Act of 2006 (AB 32)	4
4. National Consumer Products Regulations	5

Chapter II. Public Process	7
Chapter III. Statutory Requirements and the State Implementation Plan Commitment for Emission Reductions	11
A. VOC Reductions	11
B. Greenhouse Gas Reductions.....	12
C. Interpretation of the Terms Technological and Commercial Feasibility in Relation to Proposing VOC Limits.....	12
1. Technologically Feasible.....	12
2. Commercially Feasible.....	13
D. State Implementation Plans	14
1. The 2007 SIP Commitment for Consumer Products	14
2. Future SIPs	16
Chapter IV. Air Pollutants, Area Designations, and Consumer Products’ Emissions	17
A. Criteria Pollutants.....	17
1. Ozone	17
2. Fine Particulate Matter	19
B. Ambient Air Quality Standards.....	20
1. Area Designations for California Ambient Air Ozone Standard	21
2. Area Designations for California Ambient Air PM _{2.5} Standard.....	21
C. Climate Change	23
D. Consumer Product Emissions.....	24
1. VOC Emissions.....	24
2. Greenhouse Gas Emissions	25
Chapter V. Development of the Proposed VOC Limits	33
A. Surveys, Estimated Emissions, and Reductions from Categories Proposed to be Regulated.....	33
1. Consumer and Commercial Products Surveys	33
2. Staff Evaluation of Emission Reduction Opportunities	34
3. VOC Emissions, Proposed Categories, and Limits	34
4. Greenhouse Gas Emissions	36
B. Commercial and Technological Feasibility of the Proposed VOC Limits.....	36
C. Options for Complying with the Proposed VOC Limits.....	36
D. Necessity of Proposed Amendments	39
E. Alternatives Considered	40
Chapter VI. Plain Language Description of the Proposed Amendments to the Consumer Products Regulation	43
A. Proposed Amendments to Section 94508(a): Definitions.....	44

B.	Proposed Amendments to Section 94509: Standards for Consumer Products.....	46
1.	Proposed Amendments to Section 94509(a) - Table of Standards	47
2.	Proposed Modifications to Subsections 94509 (i)(3), (m), (n), (o), (p), (q), (r), (t), and (u).....	49
C.	Proposed Amendments to Sections 94510: Exemptions and Section 94515: Test Methods	52
D.	Proposed Amendments to Section 94512: Administrative Requirements	52
E.	Proposed Amendments to Method 310.....	52
Chapter VII. Description of Product Categories		57
A.	Flying Bug Insecticide (aerosol)	57
B.	Furniture Maintenance Product (aerosol).....	61
C.	General Purpose Cleaner (nonaerosol)	63
D.	General Purpose Degreaser (nonaerosol)	68
E.	Glass Cleaner (nonaerosol)	73
F.	Heavy-duty Hand Cleaner or Soap (nonaerosol)	77
G.	Metal Polish or Cleanser	82
H.	Oven or Grill Cleaner	86
I.	Special-purpose Lubricant	91
J.	Spot Remover (Dry Clean Only)	94
K.	Wasp or Hornet Insecticide (aerosol).....	101
Chapter VIII. Economic Impacts.....		109
A.	Summary of Economic Impacts	109
B.	Costs of Compliance.....	111
1.	Recurring Costs	111
2.	Nonrecurring Costs	112
3.	Total Costs.....	117
4.	Cost per Unit.....	119
5.	Cost-effectiveness (CE)	123
C.	Return on Owners' Equity	124
1.	Affected Businesses	124
2.	Analysis Approach	124
3.	Assumptions	125
4.	Results.....	125
D.	Impacts on California Businesses, Consumers, and State and Local Agencies	126
1.	Potential Impact on California Businesses.....	126
2.	Potential Impact on Business Creation, Elimination or Expansion	127
3.	Potential Impact on Business Competitiveness	127
4.	Potential Impact on California Employment	127
5.	Impacts on California Consumers	128
6.	Potential Impacts to California State or Local Agencies.....	129

E.	Other Possible Economic Impacts of Regulatory Changes	129
F.	Mitigation of Potential Impacts Through Additional Regulatory Flexibility	129
Chapter IX. Environmental Impacts		133
A.	Legal Requirements Applicable to the Analysis	133
B.	Summary of Proposed Amendments	134
C.	Summary of Impacts on Atmospheric Processes.....	135
1.	Impacts of Proposed Amendments on Ground-level Ozone Concentrations.....	135
2.	Impacts of Proposed Amendments on Particulate Matter (Secondary Organic Aerosols)	138
3.	Impacts of Proposed Amendments on Climate Change	140
4.	Impacts of Proposed Amendments on Stratospheric Ozone Depletion	142
D.	Other Potential Environmental Impacts.....	144
1.	Impacts of Proposed Amendments on Solid Waste Disposal	144
2.	Impacts of Proposed Amendments on Water Quality	146
3.	Impacts of Proposed Amendments on Energy.....	147
E.	Analysis of Need for Reasonably Foreseeable Mitigation Measures	149
1.	Proposed Mitigation Measure to Prohibit Use of Certain Chlorinated TACs .	149
2.	Proposed Mitigation Measure Related to Greenhouse Gas Emissions.....	150
3.	Proposed Mitigation Measure Related to Use of Alkylphenol Ethoxylates	151
F.	Risk Assessment for Implementing the Proposed Amendments.....	152
G.	Alternative Means of Compliance	153
H.	Environmental Justice.....	153
Chapter X. Future and Ongoing Activities		157
A.	Consumer Product Emissions Reduction Commitments in the State Implementation Plan (SIP)	157
B.	Consumer and Commercial Products Survey	158
C.	Compliance Assistance.....	158

List of Tables

Table ES-1	Consumer Product SIP Commitment and Progress to Date.....	4
Table ES-2	Proposed VOC Limits by Product Form, Emissions, and Reductions at Effective Date	7
Table ES-3	Summary of Complying Products and Complying Market Shares	10
Table III-1	Consumer Product SIP Commitment and Progress to Date	15
Table IV-1	Ambient Air Quality Standards for Ozone, PM ₁₀ and PM _{2.5}	21
Table V-1	Proposed VOC Limits, Emissions, and Reductions at Effective Date.	35
Table V-2	Summary of Complying Products and Complying Market Shares	37
Table VI-1	Proposed New and Modified Definitions.....	44

Table VI-2	Proposed VOC Limits by Product Form and Effective Dates.....	48
Table VII-1	Flying Bug Insecticide.....	58
Table VII-2	Flying Bug Insecticide Proposal	60
Table VII-3	Furniture Maintenance Product	61
Table VII-4	Furniture Maintenance Product Proposal	62
Table VII-5	General Purpose Cleaner	64
Table VII-6	General Purpose Cleaner Proposal.....	66
Table VII-7	General Purpose Degreaser.....	70
Table VII-8	General Purpose Degreaser Proposal.....	73
Table VII-9	Glass Cleaner.....	74
Table VII-10	Glass Cleaner Proposal.....	76
Table VII-11	Heavy-duty Hand Cleaner or Soap.....	77
Table VII-12	Heavy-duty Hand Cleaner or Soap Proposal.....	79
Table VII-13	Metal Polish or Cleanser	83
Table VII-14	Metal Polish or Cleanser Proposal	85
Table VII-15	Oven or Grill Cleaner	88
Table VII-16	Oven or Grill Cleaner Proposal.....	90
Table VII-17	Special-purpose Lubricant.....	91
Table VII-18	Special-purpose Lubricant Proposal.....	93
Table VII-19	Spot Remover (Dry Clean Only)	97
Table VII-20	Spot Remover (Dry Clean Only) Proposal.....	99
Table VII-21	Wasp or Hornet Insecticide	101
Table VII-22	Wasp or Hornet Insecticide Proposal	104
Table VIII-1a	Estimated Change in Formula Cost per Unit	113
Table VIII-1b	Total Estimated Recurring Cost.....	114
Table VIII-2	Estimated Nonrecurring per Product Costs to Comply with the Proposed Limits.....	116
Table VIII-3	Estimated Total Nonrecurring Cost per Category	118
Table VIII-4	Estimated Total Costs to Comply with the Proposed VOC Limits.....	120
Table VIII-5a	Estimated Per-Unit Cost Increases from Annualized Nonrecurring and Annual Recurring Costs.....	121
Table VIII-5b	Sum of Estimated Per-Unit Cost Increases from Both Annualized Nonrecurring and Annual Recurring Costs	122
Table VIII-6	Comparison of Cost-Effectiveness for ARB Consumer Product Regulations/Measures.....	123
Table VIII-7	Summary of Decline in Return on Owners' Equity (ROE).....	126
Table VIII-8	California Employment and Payroll in Affected Industries	128
Table IX-1	Proposed VOC Limits, Emissions, and Reductions at Effective Date.....	136
Table X-1	Consumer Product VOC Reductions Accredited Toward SIP Commitment.....	157

List of Figures

Figure IV-1	Number of Days the State Eight Hour Ozone Standard was Exceeded in Each Air Basin During 2007.....	18
Figure IV-2	Area Designations for State Ambient Air Quality Standard for Ozone.....	22
Figure IV-3	Area Designations for State Ambient Air Quality Standard for PM _{2.5} ..	23
Figure IV-4	Consumer Products VOC Emission Trends	26

List of Appendices

Appendix A	Proposed Amendments to the Regulation for Reducing Emissions from Consumer Products	
Appendix B	Proposed Amendments to Method 310: “Determination of Volatile Organic Compounds in Consumer Products and Reactive Organic Compounds in Aerosol Coating Products”	
Appendix C	Summary of Consumer Product Regulatory Actions	
Appendix D	Recurring Cost Estimates	
Appendix E	Nonrecurring Cost Estimates	

**State of California
AIR RESOURCES BOARD**

**Initial Statement of Reasons for Proposed Amendments to the
California Regulation for Reducing Emissions from
Consumer Products
and
Test Method 310: “Determination of Volatile Organic Compounds in
Consumer Products and Reactive Organic Compounds in
Aerosol Coating Products”**

Executive Summary

Executive Summary

In this rulemaking, California Air Resources Board (ARB or Board) staff is proposing amendments to the Regulation for Reducing Emissions from Consumer Products (Consumer Products Regulation). The amendments are primarily designed to reduce volatile organic compound (VOC) emissions. The proposed amendments would set new or lower VOC limits for 11 categories of consumer products. When fully implemented, about 6.7 tons per day of VOC emission reductions would be achieved and be creditable to the current State Implementation Plan (SIP) commitment. These reductions are an incremental step toward attaining the national ambient air quality standard for ozone. Additional reductions would be achieved and creditable toward future SIP commitments.

We are also proposing to prohibit the use of several chlorinated Toxic Air Contaminants (TAC) in three categories, preclude use of compounds with higher global warming potential (GWP) values in six categories, and prohibit use of alkylphenol ethoxylate surfactants in five categories. These proposals are mitigation measures developed in accordance with the California Environmental Quality Act (CEQA). They are designed to ensure that TAC chlorinated solvents, compounds with higher GWP values, and certain surfactants are not used to meet new and lower VOC limits. Other amendments would clarify and improve existing regulatory provisions. The regulation is codified in title 17, California Code of Regulations, sections 94507-94517.

Amendments to the analytical method “Determination of Volatile Organic Compounds in Consumer Products and Reactive Organic Compounds in Aerosol Coating Products” (Test Method 310) are also proposed. The amendments would set forth analytical methods and procedures to be followed to determine the VOC content of “Fabric Softener-Single Use Dryer Product” and the aromatic compound content of “Paint Thinner” and “Multi-purpose Solvent” products.

This Executive Summary, together with the Technical Support Document, is the Initial Statement of Reasons for Proposed Rulemaking required by the California Administrative Procedure Act. Appendices A and B contain the amendments to the Consumer Products Regulation, and Test Method 310, respectively. The proposed changes are shown in underline and ~~strikeout~~ format.

Among other things, this Executive Summary provides a description of the proposed amendments to the Consumer Products Regulation and to Test Method 310, and explains the rationale for the proposed changes. In accordance with Government Code

section 11346.2(a)(1), a “plain English” summary of the proposal is provided in Chapter VI of the Technical Support Document.

A. Authority to Regulate Consumer Products

Consumer products are chemically formulated products used by household and institutional consumers. Examples include detergents; cleaning products; floor finishes; personal care products; lawn and garden products; air fresheners; disinfectants; automotive specialty products; paint thinners; insecticides; and aerosol paints.

The Health and Safety Code sets forth ARB’s authority to regulate consumer products to control VOC emissions and greenhouse gas (GHG) emissions. Section 41712 specifies requirements to reduce VOC emissions as a ground-level ozone control strategy. Section 38500 *et seq.*, establishes authority to reduce emissions of GHGs from consumer products as part of ARB’s climate change mitigation strategy.

B. Existing Regulations

Over the last twenty years, the Board has taken numerous actions to fulfill the legislative mandates pertaining to the regulation of consumer products. Five regulations have been adopted. Three regulations have set VOC limits for 127 consumer product categories. The adopted limits, when fully effective, will have resulted in reducing emissions by about 225 tons per day, an overall 50 percent reduction in VOC emissions compared to 1990 levels. By 2020, limits on the use of ingredients with higher GWP values will be equivalent to reducing about 0.23 million metric tons of carbon dioxide equivalents per year.

We have also reduced exposure to TACs. Emissions of TACs have been reduced by over 13 tons per day by prohibiting use of chlorinated compounds in 72 categories.

Two regulations, the Alternative Control Plan and the Hairspray Credit Program, have been adopted to provide compliance flexibility to companies.

These five regulations are codified in title 17, California Code of Regulations, sections 94500 to 94575.

C. Regulatory Development Process

In order to involve the public, the Consumer Products Regulation Workgroup (CPRWG), was formed. Participation in the CPRWG is open to any member of the public. The CPRWG participated in the development of the 2006 Consumer and Commercial Products Survey (2006 Survey) and the 2008 Survey for Dry Clean Only Spot Remover products (2008 Survey Update). The CPRWG was instrumental in the development of these proposed amendments. Consumer product manufacturers; chemical producers;

marketers; trade associations; environmental groups; air districts; and various other stakeholders are all active participants.

In addition to the CPRWG meetings, an initial public workshop was held in August of 2008, to begin the public process of developing this proposal. Two more public workshops to discuss proposals were held on April 13, 2010, and July 29, 2010. Prior to the public workshops we posted materials to the consumer products program website for review and comment. Stakeholders could participate in person or *via* teleconference at each workshop. In addition to these public meetings, numerous meetings with individual stakeholders and associations were held.

D. Basis for the Proposal and VOC Emissions

Emissions of VOCs from consumer products contribute to the formation of both ground-level ozone and particulate matter pollution. This section focuses on reducing VOCs as a ground-level ozone control strategy. Despite reducing emissions by 225 tons per day, it is estimated that the 2010 consumer products emissions are approximately 245 tons per day, or about 12 percent of the overall statewide VOC inventory. We also estimate that the 2010 consumer product emissions comprise about 18 and 7 percent of VOC emissions in the South Coast Air Quality Management District (SCAQMD) and the San Joaquin Valley Air Pollution Control District (SJVAPCD), respectively. Without further actions, consumer product emissions are expected to grow to approximately 270 tons per day statewide in 2020, representing almost 14 percent of statewide VOC emissions (ARB, 2009a).

The categories for which VOC limits are proposed in this rulemaking emit about 22 tons per day of VOCs. The basis for this estimate is the 2006 Survey and the 2008 Survey Update. The 2006 Survey was mailed to over 5,000 companies in July 2007. Over 570 companies responded to the 2006 Survey with information on over 12,000 products (ARB, 2007e). The 2008 Survey Update was sent to manufacturers of spot removers primarily used at dry cleaning operations in January 2009. Eight companies responded with information on about 50 products (ARB, 2009e).

The 2006 Survey and 2008 Survey Update provided staff with detailed information on the formulations of consumer products proposed for regulation. Data summaries from the 2006 Survey and the 2008 Survey Update were posted to the website and input from industry was used to correct inaccuracies in the data. For this rulemaking, the emissions data from the 2006 Survey and the 2008 Survey Update were grown by population to predicted 2010 emissions. Staff is confident that the 2006 Survey and 2008 Survey Update had adequate representation of the available technologies in the market place for the categories proposed for regulation and finds that the data are adequate to support the proposal.

E. Consumer Product VOC Emission Reduction Commitments in the State Implementation Plan (SIP)

Reduction of VOC emissions is necessary to attain the ambient air quality standards for ozone. In 1988, with the passing of the California Clean Air Act, the importance of controlling emissions from consumer products was set forth. To meet the federal ozone standard, in 1994 emission reductions from consumer products became part of the SIP to meet the federal standard for ozone.

The 2007 SIP, the State Strategy for California's 2007 State Implementation Plan, is California's plan to attain the national ozone standard of 0.08 parts per million (ppm) averaged over eight hours. In this SIP ARB committed to an additional 30 to 40 ton per day VOC reduction statewide from consumer products by January 1, 2014.

Table ES-1 shows our progress and remaining reductions needed to meet the consumer products commitment in the SIP. As shown in the table, the adopted rulemakings from 2008 and 2009 will result in over 19 tons per day of reductions once fully effective.

**Table ES-1
Consumer Product SIP Commitment and Progress to Date**

Consumer Products Rulemaking	Statewide VOC Reductions (tons per day)
June 2008 Amendments	4.5 (adopted)
September 2009 Amendments	14.7* (adopted)
2010 Amendments (this proposal)	6.7 (proposed)
Additional Reductions from Consumer Product Categories	~ 4.0 – 14.0 (needed)
Totals Reductions Needed by January 1, 2014	30 – 40

* Emission reductions of about 12.7 tons per day of this reduction occur in all areas of the State except the South Coast Air Quality Management District (district has their own rule, Rule 1143, for Paint Thinners and Multi-purpose Solvents) (ARB, 2009c).

The amendments proposed in this rulemaking are the third increment of emission reductions toward fulfilling the SIP commitment for VOC reductions from consumer products. As shown, if adopted this proposal would contribute an additional 6.7 tons per day statewide toward the commitment. Additional rulemakings will be necessary to complete the commitment.

F. Summary of Proposed Amendments to the Consumer Products Regulation

Amendments are proposed to the following sections of the regulation: section 94508 "Definitions;" section 94509 "Standards for Consumer Products;" section 94510 "Exemptions;" section 94512 "Administrative Requirements;" and section 94515 "Test Methods." The proposed modifications to sections 94510 and 94515 are minor

clarifications to reference new sections or delete redundant language. The proposed amendments to the other sections are summarized below. A summary of proposed amendments to Test Method 310 is also provided. Chapter VI of the Technical Support Document contains more detailed information on each proposed requirement.

1. Definitions (section 94508)

Section 94508 “Definitions,” provides all of the terms used in the Consumer Products Regulation which are not self-explanatory. The proposed amendments to the Regulation include the modification of 16 definitions, and the addition of 3 new definitions. These definitions are necessary to define categories proposed for VOC limits, clarify products that are not subject to the VOC limits, or to improve the enforceability of the Consumer Products Regulation. We are also proposing a minor change to the definition for Artist’s Solvent/Thinner products to change the size criterion from 32 to 34 fluid ounces. This definitional change, as well as a several other definition proposals, are further explained in Chapter VI.

2. Proposed Amendments to Standards for Consumer Products (section 94509)

Amendments are being proposed to the Table of Standards. Several modifications are proposed to consolidate various prohibitions on use of TAC compounds and limits on use of compounds with higher GWPs. Also proposed are prohibitions on use of certain TACs, compounds with higher GWPs, and specific surfactants in several categories.

Table of Standards: section 94509(a)

The proposed amendments would specify new or lower VOC limits for the product categories shown in Table ES-2. Together, VOC limits are proposed for 11 categories with 15 VOC limits. “Special-purpose Lubricant” products are not currently regulated, while the other categories are currently subject to VOC limits. However, in the case of “Spot Remover” and “Oven or Grill Cleaner,” additional products are proposed for inclusion. For all but one of the currently regulated categories we are proposing lower VOC limits. We are proposing to increase the current limit for nonaerosol “Oven or Grill Cleaner.” This proposal is explained below. The limits would become effective on December 31, 2012, or December 31, 2013. Where appropriate we are proposing separate limits for aerosol product forms to ensure feasibility. Other minor clarifications to the Table of Standards are also proposed.

The categories with limits becoming effective by January 1, 2014, would be creditable toward the 2007 SIP commitment, and would result in VOC emission reductions of about 6.7 tons per day. As specified in the regulation, the effective date of the limits for products requiring Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), as well as Department of Pesticide Regulation (DPR) registration, would be one year after the effective date listed to allow adequate time for the State and federal registration process. Because of this, the reductions from Flying Bug Insecticide and Wasp or

Hornet Insecticide products would be credited toward a future SIP commitment. Reductions from these two categories total about 0.2 tons per day.

Several of the proposed VOC limits for the categories listed in Table ES-2 warrant additional explanation.

Proposal for “Oven or Grill Cleaner”: We are proposing to incorporate grill cleaning products into the existing Oven Cleaner category. To allow the previously unregulated grill cleaner products the necessary time to reformulate, proposed subsection 94509(q) would specify that the VOC limits do not apply to these products until December 31, 2012.

Nonaerosol Oven Cleaner products are currently subject to a limit of 1 percent by weight. When this limit was adopted reported products relied on low or non-VOC caustic technologies. We have since learned of other technologies introduced to provide alternatives to caustic products. To accommodate the use of these technologies we are proposing to increase the current VOC limit to 4 percent by weight for nonaerosol Oven or Grill Cleaner products. To expedite providing this alternative, as proposed, the limit revision would become effective when the amendments become legally effective. This proposal results in a small shortfall of about 0.1 tons per day. However, other reductions from this proposal would offset this change.

Proposal for “Spot Remover”: We are proposing to incorporate spot removers used for dry clean-only fabrics into the currently regulated “Spot Remover” category. These are primarily products used at dry cleaning operations. To accommodate the necessary time for these products to reformulate, we are also proposing to delay the effective date of the VOC limit for “Spot Remover” products from December 31, 2010, to December 31, 2012. This modification is proposed to allow adequate time for reformulation of the new products being included in the category. The proposal to extend the effective date is intended to simplify enforcement activities for this category; it would be difficult to discern the difference between the newly added products and those currently regulated. The proposal for the “Spot Remover” category would result in delaying about a 0.25 tons per day VOC reduction for 2 years. The newly added products would also be subject to the existing prohibition on use of methylene chloride, perchloroethylene, and trichloroethylene beginning December 31, 2012.

Other Amendments to section 94509

Proposed Consolidation of Prohibitions on Use of Toxic Compounds: Currently, several subsections within section 94509 specify provisions prohibiting use of several chlorinated TACs. We are proposing to consolidate all of these requirements into two tables that would be contained in proposed modified subsection (m). One table would include all of the categories where use of methylene chloride, perchloroethylene, and trichloroethylene is prohibited. A second table would include the categories where use of para-dichlorobenzene is prohibited. The modified subsection (m) would also consolidate the provisions that specify sell-through dates and exemptions for impurities

Table ES-2
Proposed VOC Limits by Product Form, Emissions, and
Reductions at Effective Date

Product Category	Product Form	2010 VOC Emissions* (tons per day)	Proposed VOC Limit (weight percent)	VOC Reduction** (tons per day)
Flying Bug Insecticide	Aerosol	0.65	20	0.06 ⁺
Furniture Maintenance Product	Aerosol	1.32	12	0.36
General Purpose Cleaner	Nonaerosol	12.04	0.5	3.73 ⁺
General Purpose Degreaser	Nonaerosol	1.91	0.5	1.17
Glass Cleaner	Nonaerosol	3.34	3	0.41
Heavy-duty Hand Cleaner or Soap	Nonaerosol	0.79	1	0.53
Metal Polish or Cleanser	Aerosol	0.22	15	0.07
Metal Polish or Cleanser	Nonaerosol	0.20	3	0.15
Oven or Grill Cleaner	Aerosol	0.08	8	>0.0
Oven or Grill Cleaner	Nonaerosol	0.24	4	-0.12
Special-purpose Lubricant	Aerosol	0.26	25	0.10
Special-purpose Lubricant	Nonaerosol	0.18	3	0.13
Spot Remover (Dry Clean Only)	Aerosol	>0.0	15	>0.0
Spot Remover (Dry Clean Only)	Nonaerosol	0.17	3	0.17
Wasp or Hornet Insecticide	Aerosol	0.31	10	0.14 ⁺
Total Emissions 2010		21.7 tons per day		
Total VOC Reductions Creditable Toward 2007 SIP		6.7 tons per day		
Total VOC Reductions Creditable Toward Future Commitment		0.2 tons per day		

* Survey emissions adjusted for market coverage and grown to 2010 based on population

** Emission reductions grown to effective date based on population

+ Products subject to FIFRA and DPR registration requirement given an extra year to complete the registration process

(except no exemption for impurities is provided for para-dichlorobenzene). The modifications are proposed to simplify the regulation by making it easier to find the prohibitions on toxic compounds.

Proposed Additional Prohibitions on Use of Methylene Chloride, Perchloroethylene, and Trichloroethylene: New Table 94509(m)(1) also contains proposed prohibitions on use of methylene chloride, perchloroethylene, and trichloroethylene in “Metal Polish or Cleanser,” “Silicone-based Multi-purpose Lubricant,” and “Special-purpose Lubricant.” These prohibitions are proposed to ensure that use of these TACs does not occur as products are reformulated to meet the proposed VOC limits. The newly added “Spot Remover” products would be subject to the existing prohibition on use of these solvents. These prohibitions are proposed as a mitigation measure under the CEQA.

Proposed Consolidation of Prohibitions on the Use of Any Chemical Compound that has a GWP Value of 150 or Greater: At present, several subsections contain prohibitions on the use of compounds that have GWP values of 150 or greater. We are proposing to consolidate these provisions into modified subsection 94509(n). Subsection (n) would also consolidate the provisions that specify sell-through dates and exemptions for impurities. The modifications are proposed to simplify the regulation by making it easier to find the prohibitions on use of compounds with GWP values of 150 or greater.

Proposed Additional Prohibitions on the Use of Any Chemical Compound that has a GWP Value of 150 or Greater: In this rulemaking we are also proposing to limit the use of global warming compounds with higher GWP values in “Flying Bug Insecticide,” “Furniture Maintenance Product,” “Metal Polish or Cleanser,” “Special-purpose Lubricant,” “Spot Remover,” and “Wasp or Hornet Insecticide” products. These prohibitions are proposed to ensure that use of compounds with GWP values greater than or equal to 150 does not begin as products are reformulated to meet proposed VOC limits. The measure is proposed as a CEQA mitigation measure.

Proposed Prohibition on Use of Alkylphenol Ethoxylate Surfactants: Alkylphenol ethoxylates are nonionic surface active agents (surfactants) used as wetting agents, emulsifiers, and dispersants in cleaning and degreasing products. Once into wastewater, alkylphenol ethoxylates do not readily degrade and they and/or their degradation products enter aquatic environments through wastewater treatment facilities and storm water.

Alkylphenol ethoxylates, in particular octylphenol and nonylphenol ethoxylates, have been found to be toxic to aquatic species; they are hormone disruptors, with the primary concern focused on the estrogenic effects (David *et al.*, 2009). Because of this, ARB staff consulted with staff of the State Water Resources Control Board (SWRCB). Information provided to SWRCB staff indicates that alkylphenol ethoxylates are found in measurable concentrations in California’s receiving waters. Moreover, SWRCB staff is concerned that any potential additional use could adversely impact aquatic species (SWRCB, 2010a; SWRCB, 2010b; SCCWRP, 2010; and SFEI, 2010). Therefore, ARB staff is proposing a mitigation measure in accordance with CEQA. As proposed, after December 31, 2012, use of alkylphenol ethoxylate surfactants would be prohibited from use in Oven or Grill Cleaner products and in the nonaerosol forms of General Purpose Cleaner, General Purpose Degreaser, and Glass Cleaner. A prohibition on use in nonaerosol Heavy-duty Hand Cleaner or Soap products would become effective

December 31, 2013. These prohibitions are proposed to ensure that use of these compounds does not occur as products are reformulated to meet the proposed VOC limits. This proposal would be contained in modified subsection 94509(m)(3).

Staff also finds that replacements for alkylphenol ethoxylates are readily available. Alcohol ethoxylates, linear alkylbenzene sulphonates, and alkyl polyglucosides surfactants are considered to be effective and environmentally safer. Additional information on this proposal is contained in Chapter IX, Environmental Impacts, section E.

Additional Modifications to Section 94509 to Accommodate New Subsections (m) and (n): Because of the proposals to consolidate various provisions into new subsections 94509(m) and (n), additional “clean up” modifications to various subsections are proposed. These modifications include deleting several subsections and re-lettering and reorganizing remaining subsections. The references to the various toxic compound prohibitions and the GWP limits within the Table of Standards would also be modified to reference new subsections or re-lettered subsections.

3. Proposed Amendments to Administrative Requirements (section 94512)

We are proposing to amend the Most Restrictive Limit provision contained in subsection 94512(a). Specifically, subpart (3) would be modified to clarify the regulation’s applicability when two defined categories exclude each other within their respective definitions. As proposed, when a definition for a specific category excludes another specific category, and *vice versa*, the product is subject to the VOC limit for whichever category is lower.

G. Proposed Amendments to Test Method 310

ARB Test Method 310 sets forth the analytical procedures and processes to determine the VOC content of consumer products. We are proposing to amend this method to incorporate additional testing procedures and standard test methods to analyze consumer products for compliance. These modifications are proposed to specify the procedures to be used to analyze for the aromatic compound content in “Paint Thinner” and “Multi-purpose Solvent” products, and the VOC content of “Fabric Softener-Single Use Dryer Product.”

Proposed amendments to section 2 of Method 310 would include additional applicable test methods to analyze consumer products for compliance.

New subsections are also being proposed. Proposed new subsection 3.3.8 would specify the procedures for analyzing for aromatic compound content in “Paint Thinner” and “Multi-purpose Solvent” products. New section 4.2.3 would specify the procedures for analyzing for the VOC content of “Fabric Softener-Single Use Dryer Product.”

H. Compliance with the Proposed Amendments

Manufacturers have the flexibility to choose from a variety of formulation options to meet the applicable limits (see Chapter VII, Description of Product Categories). To comply with VOC limits, VOC solvents or propellants may need to be replaced, or partially replaced, with VOC exempt ingredients. This may require using VOC exempt compounds, or formulating with an exempt VOC propellant. Use of water or low vapor pressure (LVP) VOC compounds is also feasible. Manufacturers may also need to change the valve, container, delivery system, or the other components of the consumer product depending on the individual formulation. For each category and proposed VOC limit staff has determined feasible pathways toward reformulation. We also note that the survey data show that, in each category, products are already being sold that comply with the proposed VOC limits. Table ES-3 shows the number of products and percent of the market that would currently comply with staff's proposed VOC limits.

Table ES-3
Summary of Complying Products and Complying Market Shares

Product Category	Product Form	Proposed VOC Limit (weight percent)	Number of Complying Products/Total Products	Percent Complying Market Share
Flying Bug Insecticide	Aerosol	20	18 / 51	55
Furniture Maintenance Product	Aerosol	12	37 / 87	10
General Purpose Cleaner	Nonaerosol	0.5	980 / 1518	69
General Purpose Degreaser	Nonaerosol	0.5	232 / 462	73
Glass Cleaner	Nonaerosol	3	165 / 298	10
Heavy-duty Hand Cleaner or Soap	Nonaerosol	1	113 / 255	30
Metal Polish or Cleanser	Aerosol	15	20 / 73	35
Metal Polish or Cleanser	Nonaerosol	3	96 / 154	78
Oven or Grill Cleaner	Aerosol	8	18 / 21	87
Oven or Grill Cleaner	Nonaerosol	4	81 / 90	> 95
Special-purpose Lubricant	Aerosol	25	64 / 168	47
Special-purpose Lubricant	Nonaerosol	3	166 / 224	97
Spot Remover (Dry Clean Only)	Aerosol	15	<5 / <5	<5
Spot Remover (Dry Clean Only)	Nonaerosol	3	16 / 49	46
Wasp or Hornet Insecticide	Aerosol	10	38 / 56	60

Source: 2006 Consumer & Commercial Products Survey and 2008 Spot Remover Survey Update.

Staff concludes that technology exists, and is readily available to comply with the proposed limits in the timeframes provided. Staff has also proposed limits that are feasible without the use of compounds with GWPs of 150 or greater, alkylphenol ethoxylates, and the TACs methylene chloride, perchloroethylene, and trichloroethylene.

Several reformulation options warrant further discussion.

LVP-VOC Glycol Ethers

Stakeholders, as well as ARB staff, had concerns that reformulations to comply with the VOC limits for various cleaning products could result in use of certain compounds that may pose adverse health impacts. Staff evaluated various reformulation options and identified use of LVP-VOC glycol ethers as one of several reformulation options. To fully evaluate whether use of LVP-VOC glycol ethers would pose potential health hazards, ARB staff consulted with the Office of Environmental Health Hazard Assessment (OEHHA).

Based on available health effects data OEHHA developed draft provisional Reference Exposure Levels (REL) for a number of LVP-VOC glycol ethers. A REL is a concentration in air that is considered safe. However, due to lack of publicly available health effects data, large uncertainty factors were applied to the RELs. Further analysis by OEHHA determined that the RELs should not be used as a basis for regulatory action due to an overall lack of information on the toxicity of these compounds. OEHHA will continue to monitor developments in the toxicological literature and will re-evaluate the provisional RELS in the future, if needed (OEHHA, 2010).

In addition, based on staff's ongoing analysis of reformulation approaches we have concluded that use of these compounds is neither necessary, nor the preferred reformulation approach. This is because a large share of products that already comply with the proposed VOC limits for "General Purpose Cleaner" and "General Purpose Degreaser" do not rely on use of LVP-VOC glycol ethers. We also believe the proposed VOC limit for "Glass Cleaner" products is set at a level such that use of LVP-VOC glycol ethers is not needed. Nevertheless, we will monitor use of the LVP-VOC glycol ethers through regular surveys of the industry.

Acetone

Staff has identified use of acetone as a potential reformulation option in specific categories. Acetone is a low photochemically reactive compound that has been excluded from the definition of VOC. However, concerns with its use have been raised because it is an extremely flammable solvent. Although acetone may have limited use in some categories, as shown in Appendix D, 'typical' complying and noncomplying formulas used as a basis for our economic analysis did not include acetone. This indicates that other reformulations to comply are more likely. In other cases where it could be used it would be in small amounts or in products already labeled to warn

consumers of flammability concerns. Therefore, we do not believe any additional use of acetone would pose safety concerns.

Other Compliance Options

Manufacturers can also comply with the proposed amendments through the use of the Innovative Products Provision (IPP) which allows a product to exceed the VOC limit if it is clearly demonstrated that the “innovative” product will result in less VOC emissions than a complying product that meets the applicable VOC limit.

Manufacturers can also comply with the proposed amendments through the use of the Alternative Control Plan (ACP) that allows emissions averaging of various regulated products throughout their product lines.

I. Economic Impacts

The economic impacts of the proposed amendments are summarized below. Our complete analysis of these impacts is contained in Chapter VIII of the Technical Support Document.

1. Overall Cost

We estimate that the overall cost to comply with the proposed amendments is about \$5 million per year for ten years, for a total of almost \$50 million. This amount includes both recurring (e.g., raw materials) and nonrecurring (e.g., research and development) costs and is estimated based on assumptions specific to each category. The cost represents the average of low and high cost estimates and represents our prediction of the costs most likely to be incurred.

2. Cost-effectiveness

Another measure of the economic impacts of the proposal is to determine the “dollars to be spent per pound of VOC reduced,” or cost-effectiveness (CE). The CE of the proposed amendments has been calculated to be about \$0.98 per pound of VOC reduced. This is based on total expected emission reductions of about 6.9 tons per day (includes reductions occurring in 2014). The CE of Consumer Product Regulation amendments proposed in 2006, 2008, and 2009 was about \$2.35, \$6.23, and \$0.29 per pound of VOC reduced, respectively. Thus, the CE of this proposal is within the range of previously adopted consumer products amendments.

3. Return on Owner’s Equity (ROE)

Another measure of the impacts of the proposed amendments on manufacturers is to determine the ROE. ROE is a calculation which compares a company’s percentage reduction in profitability after incurring the costs associated with the proposed amendments. In calculating ROE, we make the conservative assumption that

manufacturers will absorb all compliance costs without passing any of these costs on to the consumer. Our analysis found that the overall reduction in profitability ranges from about 1 percent to about 3 percent, with an average reduction in profitability of about 1.6 percent.

Based on the small reduction in profitability, we believe that overall, most affected businesses' profitability will not be adversely affected. If they are unable to absorb all or a portion of the compliance costs, these costs will be passed through to the consumer.

4. Impacts on California Businesses

Because we believe that the proposed amendments would not significantly alter the profitability of most businesses, as shown in our ROE analysis, we do not expect a noticeable change in employment; business creation; elimination or expansion; and business competitiveness in California. However, the proposed amendments may impose economic hardship on businesses with very little or no margin of profitability.

5. Increased Cost to Consumers

As a result of this proposal, consumers may have to pay more for some products, depending on the extent to which manufacturers pass along their compliance costs. If all assumed compliance costs are passed on to the consumer, we estimate the cost per unit increase would range from negligible or no cost for a nonaerosol Glass Cleaner product to about \$0.44 for a Heavy Duty Hand Cleaner or Soap product. The aforementioned costs do not include typical retail mark-up.

6. Fiscal Impacts

No significant adverse economic impacts to any local or State agency were identified. We are aware that the California Prison Industry Authority (PIA) manufactures some products for which VOC limits are proposed. Based on the 2006 Survey, the PIA manufactures nonaerosol "General Purpose Cleaner," "General Purpose Degreaser," and "Glass Cleaner" products. All of these reported products already comply with the proposed VOC limits for these categories. Therefore, we expect no impacts on the PIA.

ARB will have costs for enforcing the proposed amendments. It is estimated that beginning in fiscal year 2012-13 the Enforcement Division will require an additional 1.5 staff. The costs for these additional resources will need to be addressed in the future.

J. Environmental Impacts

The proposed amendments to the Consumer Products Regulation are primarily designed to reduce VOC emissions. Therefore, implementing the proposed VOC limits would have an overall positive impact on the environment by reducing exposure to ground-level ozone. Other proposed amendments would either have no impact or

would have beneficial impacts on the environment. No significant adverse impacts were identified, however several mitigation measures are proposed to ensure no adverse impacts would result.

Once fully effective, VOC emissions would be reduced statewide by about 6.9 tons per day. Our qualitative health risk assessment concludes that because VOCs are ozone precursors, public health is further protected by reducing these emissions. The actual lowering of health risks has not been quantified. The reductions resulting from this proposal would be an incremental step toward achieving the State and federal ozone standards.

In addition to ground level ozone impacts, we evaluated how implementing the proposed amendments would impact particulate matter (particularly secondary organic aerosols); climate change, stratospheric ozone depletion; solid waste disposal; water quality; and energy use. No potential adverse impacts were identified. However, our evaluation of potential use of several TACs, compounds with higher GWP values, and certain surfactants indicated that there was a potential for adverse impacts resulting from compliance with the proposed VOC limits. Therefore, to address these impacts staff is proposing mitigation measures in accordance with CEQA. A complete analysis of the potential environmental impacts of the proposal is contained in Chapter IX of the Technical Support Document. A summary of proposed mitigation measures follows.

1. Prohibition on Use of Certain Toxic Air Contaminants

A mitigation measure, in accordance with CEQA, is proposed to prohibit the use of the TACs methylene chloride, perchloroethylene, and trichloroethylene in “Metal Polish or Cleanser,” “Silicone-based Multi-purpose Lubricant,” and “Special Purpose Lubricant” products. These provisions are proposed in subsection 94509(m) and are designed to ensure that use of these solvents does not occur as products reformulate to meet VOC limits. This proposal would reduce toxic emissions by about 0.1 ton per day.

2. Limit on Use of Global Warming Compounds

Several compounds with higher GWPs could be used in reformulated products. To minimize climate change impacts from implementing the proposed VOC limits, we are proposing to prohibit use of compounds with GWP values of 150 or greater in “Flying Bug Insecticide,” “Furniture Maintenance Product,” “Metal Polish or Cleanser,” “Special-purpose Lubricant,” “Spot Remover,” and “Wasp or Hornet Insecticide” products. These prohibitions are proposed to ensure that use of compounds with GWP values greater than or equal to 150 does not begin as products are reformulated to meet proposed VOC limits. These provisions are proposed in subsections 94509(n). This proposal would allow use of the propellant hydrofluorocarbon (HFC) 152a, but preclude the use of HFC-134a. This limit is also proposed as a mitigation measure under CEQA.

3. Prohibition on Use of Alkylphenol Ethoxylate Surfactants

Alkylphenol ethoxylates are nonionic surface active agents (surfactants) used as wetting agents, emulsifiers, and dispersants in cleaning and degreasing products. For some categories one reformulation pathway to meet proposed VOC limits would be to replace VOC solvents with surfactants. Alkylphenol ethoxylates meet the definition of LVP-VOC so their use is not currently restricted by the VOC limits in the Consumer Products Regulation. In the cleaning/degreasing categories, because of how the products are used, some product is washed 'down the drain.' Once into wastewater, alkylphenol ethoxylates do not readily degrade and they and/or their degradation products enter aquatic environments through wastewater treatment facilities and storm water.

Ample scientific evidence implicates the alkylphenol ethoxylates, particularly the octylphenol and nonylphenol ethoxylates, as toxic to aquatic species. Therefore, as a mitigation measure under CEQA, we are proposing that use of alkylphenol ethoxylate surfactants would be prohibited from use in Oven or Grill Cleaner products and in the nonaerosol forms of General Purpose Cleaner, General Purpose Degreaser, and Glass Cleaner products effective on December 31, 2012. We are also proposing that the alkylphenol ethoxylate surfactants be prohibited from use in Heavy-duty Hand Cleaner or Soap products effective December 31, 2013. These prohibitions are proposed to ensure that use of these compounds does not occur as products are reformulated to meet the proposed VOC limits. This proposal would be contained in modified subsection 94509(m)(3).

K. Environmental Justice

This proposal is consistent with the ARB's Environmental Justice Policy to reduce health risks in all communities, including low-income and minority communities. Generally, use of consumer products is fairly uniform across the State, tracking with population, and their emissions are spread over the course of a day, rather than concentrated at a particular time of day. For these reasons, we do not believe that people of any given race, culture, or income would be more impacted than any others would. All Californians should benefit equally from the reduction in VOC emissions from the consumer product categories proposed for regulation.

L. Future Plans

Future activities include continued review of the 2006 Consumer and Commercial Products Survey to determine if more VOC reductions are feasible. We also plan to conduct an additional survey to update emissions of aerosol coating products and various other consumer products. This survey will serve as the basis for completing the SIP commitment for consumer products.

We also will explore options for identifying complying products destined for sale in California and develop advisories to clarify what constitutes “incidental use” and to clarify how limits for “general” purpose products are enforced.

M. Recommendation

We recommend that the Board adopt these proposed amendments to the Consumer Products Regulation and Test Method 310.

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**State of California
AIR RESOURCES BOARD**

**Initial Statement of Reasons for Proposed Amendments to the
California Regulation for Reducing Emissions from
Consumer Products
and
Test Method 310: “Determination of Volatile Organic Compounds in
Consumer Products and Reactive Organic Compounds in
Aerosol Coating Products”**

Technical Support Document

Chapter I. Introduction

In this rulemaking Air Resources Board (ARB) staff is proposing amendments to the Regulation for Reducing Emissions from Consumer Products (Consumer Products Regulation) that are designed to reduce the volatile organic compound (VOC) content of various consumer products. Mitigation measures are also proposed to ensure that use of several toxic air contaminants, compounds with higher global warming potential (GWP) values, and certain surfactants are not used as replacements to meet the proposed VOC limits. Other proposals would clarify and improve existing regulatory provisions and definitions. The regulation is codified in title 17, California Code of Regulations, sections 94507-94517. The proposed amendments are necessary as an incremental step towards fulfilling the consumer products element of the 2007 State Implementation Plan for Ozone.

Amendments to the test method used to verify consumer products' compliance with VOC limits are also proposed. These amendments to Test Method 310: "Determination of Volatile Organic Compounds in Consumer Products and Reactive Organic Compounds in Aerosol Coating Products" (Test Method 310) are necessary to enforce newly adopted provisions in the Consumer Products Regulation.

This Technical Support Document is ARB staff's technical justification and analysis of the proposed amendments. It is part of the Initial Statement of Reasons (ISOR) for Proposed Amendments to the California Consumer Products Regulation and Test Method 310. The proposed amendments to the Consumer Products Regulation and Test Method 310 can be found in Appendices A and B, respectively, of this document.

Included in this Technical Support Document is the following information:

- background information on the consumer products program related to the control of VOC and greenhouse gas (GHG) emissions;
- information on the public process used to develop the proposed amendments;
- an overview of the requirements of State law and the State Implementation Plan commitment for consumer products;
- an overview of air quality focusing on criteria pollutants and climate change which are germane to the regulation of consumer products;
- a review of the emissions from the categories proposed for regulation and development of the VOC limits;
- a description, in plain language, of the proposed amendments to the Consumer Products Regulation and Test Method 310;

- an analysis of the estimated economic impacts of the proposed amendments;
- an analysis of the environmental impacts of the proposed amendments; and
- a summary of future activities.

A. Enabling Legislation

The Health and Safety Code sets forth ARB's authority to regulate consumer products. Section 41712 sets forth the authority to control VOC emissions to reduce ground-level ozone concentrations. Section 38500 *et seq.* provides the authority to reduce emissions of GHGs. Authority to mitigate potential adverse impacts of proposed regulations is set forth in Public Resources Code section 21000 *et seq.* A summary of each of these requirements in State law follows.

1. Health and Safety Code section 41712

In 1988, the California Clean Air Act (CCAA or "the Act") added section 41712 to the California Health and Safety Code. The intent of section 41712 is primarily to reduce ground-level ozone concentrations. Section 41712, along with subsequent amendments, requires ARB to adopt regulations to achieve the maximum feasible reduction in VOC emissions from consumer products. The CCAA specified that attainment of the California State ambient air quality standards is necessary to promote and protect public health, particularly of children, older people, and those with respiratory diseases. The Legislature also directed that these standards be attained by the earliest practicable date.

Prior to adoption, the Board must determine that adequate data exist to establish that the regulations are necessary to attain State and federal ambient air quality standards. Commercial and technological feasibility of the regulations must also be demonstrated. The Act further stipulates that regulations adopted must not eliminate any product form, and that recommendations from health professionals be considered when developing VOC control measures for health benefit products.

2. Health and Safety Code section 38500 *et seq.*

In 2006, Assembly Bill (AB) 32, The California Global Warming Solutions Act of 2006, was signed into law. This law created a comprehensive, multi-year program to reduce GHG emissions in California. The California Health and Safety Code, commencing with section 38500, contains these provisions. AB 32 requires ARB to develop regulations and consider market-based compliance mechanisms that will ultimately reduce California's GHG emissions to the 1990 baseline year by 2020. Beyond the requirements of AB 32, the Governor's Executive Order EO-S-03-05 calls for an 80 percent GHG reduction from 1990 levels by 2050.

AB 32 required ARB to identify a list of "discrete early action greenhouse gas reduction measures" by June 30, 2007. Once on the list, these measures are to be developed into regulatory proposals, adopted by the Board, and made legally enforceable

(approved by Office of Administrative Law) by January 1, 2010. Reduction of compounds with higher GWP values that are used in consumer products was designated as one of these measures, and became part of the State's comprehensive strategy when the Board approved the Scoping Plan on December 12, 2008.

3. Public Resources Code section 21000 *et seq.*

In addition to requirements set forth in California's Health and Safety Code, the California Environmental Quality Act (CEQA) requires that environmental impacts of proposed regulations be evaluated. If significant adverse environmental impacts are identified, mitigation measures must be put in place, if available, to reduce or eliminate such impacts. California's Public Resources Code, commencing with section 21000 *et seq.*, specifies these provisions.

B. Background

To date, the Board has taken numerous actions to fulfill the legislative mandate pertaining to the regulation of VOCs in consumer products. A synopsis of the regulations adopted to date follows.

1. Existing Consumer Product Regulations

Three regulations have been adopted that affect 127 consumer product categories. These limits, once fully effective will result in reducing VOC emissions by about 225 tons per day by the end of 2013, an overall 50 percent reduction.

Exposure to toxic air contaminants (TAC) has also been reduced by prohibiting use of certain chlorinated compounds in 72 categories. Total emissions of TACs have been reduced by over 13 tons per day.

In addition, two regulations, the Alternative Control Plan and the Hairspray Credit Program have been adopted to provide compliance flexibility to companies. The five consumer product regulations are codified in title 17, California Code of Regulations, sections 94500 to 94575:

- Antiperspirants and Deodorants (Article 1, sections 94500-94506.5);
- Consumer Products (Article 2, sections 94507-94517);
- Aerosol Coating Products (Article 3, sections 94520-94528);
- Alternative Control Plan (Article 4, sections 94540-94555); and
- Hairspray Credit Program (Article 5, sections 94560-94575).

Regulation of consumer products began in 1989 with adoption of the Antiperspirants and Deodorants Regulation. The "general" Consumer Products Regulation was approved in 1990 and has been amended numerous times. The most recent amendments to the Consumer Products Regulation were adopted on August 6, 2010. These amendments set new or lower VOC limits for three categories of consumer products. When fully effective VOC emissions from the 2009 amendments will be

reduced by an additional 14.7 tons per day. The Aerosol Coatings Regulation was adopted in 1995 and was amended in 2000. A complete summary of consumer products program regulatory actions with dates of regulatory amendments are provided in Appendix C.

Greenhouse gas emission reductions of about 0.2 million metric tons of carbon dioxide equivalents (MMT CO₂e) per year have also been achieved.

2. Consumer Products and the State Strategy for California's 2007 State Implementation Plan (SIP)

Federal clean air laws require areas with unhealthy levels of ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide and inhalable particulate matter to develop SIPs describing how they will attain national ambient air quality standards (NAAQS). A SIP is a compilation of new and previously submitted plans, programs (such as monitoring, modeling, permitting, etc.), local air district rules, and State and federal regulations. The Code of Federal Regulations (CFR) Title 40, Chapter I, Part 52, Subpart F, Section 52.220 lists all of the items which are included in the California SIP.

The SIP showing how California's nonattainment areas will meet the eight-hour standard of 0.08 parts per million (ppm) was adopted at the September 25, 2007, Board hearing (ARB, 2007d). California's SIP was submitted to U.S. EPA in late 2007. As of this writing the U.S. EPA has not acted to approve this SIP.

Specific to consumer products, in the SIP, ARB committed to reducing consumer product VOC emissions statewide by 30 to 40 tons per day by January 1, 2014. This means that all limits designed to meet this commitment must be effective before January 1, 2014. Rulemakings from 2008 and 2009 will result in over 19 tons per day of reductions once fully effective. The amendments proposed in this rulemaking are the third increment toward fulfilling the commitment for VOC reductions from consumer products. Additional information on the consumer products element of the SIP, including progress toward meeting the goal, is included in Chapter III.

3. Consumer Products and the California Global Warming Solutions Act of 2006 (AB 32)

Various consumer products may contain GHGs in their formulations. Most often these GHGs are propellants such as hydrofluorocarbons (HFCs) and carbon dioxide (CO₂). To a lesser extent some GHGs are used as solvents. As mentioned earlier in this chapter greenhouse gas reductions from consumer products was designated a Discrete Early Action Measure.

The Discrete Early Action Measure is a GHG emission reduction from consumer products estimated to be 0.25 MMT CO₂e, if feasible. As mentioned previously, in 2020 the reduction achieved will be 0.23 MMT CO₂e. We continue to evaluate whether GHG

emission reductions from other consumer product categories are feasible, however, any additional measures would not be creditable to the Discrete Early Action Measure.

4. National Consumer Products Regulations

On September 11, 1998, U.S. EPA promulgated a national consumer products regulation, the “National Volatile Organic Compound Emission Standards for Consumer Products” (40 CFR Part 59, Subpart C, Sections 59.201 et seq.). This action set national VOC emission standards for various categories of consumer products. The regulation became effective on September 11, 1998, and the VOC limits became effective on December 10, 1998, (U.S. EPA, 1998a). There are similarities and differences between the California and national consumer products regulations; however, the national regulation does not preclude states from adopting more stringent regulations.

In 2011, U.S. EPA will begin working on amendments to their existing national consumer products regulation. Their amendments are based on California’s CONS-1 (2004 Consumer Products Regulation Amendments) categories and limits. The amendments are expected to become effective in 2012, with a compliance date of January 2013.

U.S. EPA has also promulgated a national regulation for aerosol coatings (spray paints) based on ARB’s Aerosol Coatings Regulation. This is a reactivity-based regulation. The national aerosol coatings regulation was promulgated on March 24, 2008. The compliance date was July 1, 2009 (U.S. EPA, 2008).

The national consumer products regulation is less effective in reducing VOC emissions from consumer products. The national regulation does not regulate a number of product categories that are currently regulated under the ARB regulation. For the categories that are regulated under both regulations, many of ARB’s limits are more stringent than the national limits. Therefore, ARB’s consumer products regulations have achieved significant additional reductions over those that would be achieved by the national regulation alone.

Because California has unique air quality problems, reducing VOC emissions from all categories, including consumer products, to the maximum extent feasible, is necessary to attain the federal and State ambient air quality standards for ozone.

The national regulations for consumer products and aerosol coatings do not prohibit the use of certain TACs. To date, the California Consumer Products Regulation includes prohibitions on the use of certain TACs in 72 categories, resulting in a reduction of toxic compound emissions of over 13 tons per day.

As of the date of this staff report, there are no national consumer products regulations related to reducing GHG emissions.

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1. Air Resources Board. State Strategy for California's 2007 Implementation Plan. Released April 26, 2007. Adopted by the Air Resources Board on September 27, 2007. (ARB, 2007d)
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3. United States Environmental Protection Agency. National Volatile Organic Compound Emission Standards for Consumer Products. (40 CFR Part 59). Federal Register: September 11, 1998. Volume 63, Number 176: 48819-48847. (U.S. EPA, 1998a)

Chapter II. Public Process

This chapter contains a description of the public process used to develop the proposed amendments. The Administrative Procedure Act (APA) (Government Code section 11340 *et seq.*) requires that development of regulations must allow for public input.

Our process for development of these proposed limits included a number of formal and informal opportunities for public participation. In order to involve the public, the Consumer Products Regulation Workgroup (CPRWG) was formed. Participation is open to any member of the public. The CPRWG participated in the development of the 2006 Consumer and Commercial Products Survey (2006 Survey). The CPRWG actively participated in the development of the 2004, 2006, 2008, and 2009 amendments, as well as, these proposed amendments.

Further, the CPRWG also participated in the development of the 2008 Survey Update for Dry Clean Only Spot Remover Products (ARB, 2009e). The intent of this survey was to evaluate emissions from spot remover products used at dry cleaning facilities. The survey was conducted in response to comments from stakeholders that indicated the market was not sufficiently covered by the 2006 Survey (ARB, 2007e). Combined, these surveys serve as the basis for this proposal.

Consumer product manufacturers, chemical producers, marketers, trade associations, and various other stakeholders listed below, have actively participated in the process.

- American Chemistry Council (ACC)
- American Cleaning Institute (ACI)
- American Coatings Association (ACA)
- Automotive Specialty Products Association (ASPA)
- Coalition for Clean Air
- Consumer Specialty Products Association (CSPA)
- Institute for Research and Technical Assistance (IRTA)
- International Sanitary Supply Association (ISSA)
- National Aerosol Association (NAA)
- Personal Care Products Council (PCPC)

Representatives from local air districts and agencies, including the South Coast Air Quality Management District (SCAQMD), and the United States Environmental Protection Agency (U.S. EPA) were also involved in the process.

ARB staff maintains a mailing list of over 5,000 companies and interested parties, including environmental organizations. We have established an electronic list serve, which has over 2,800 subscribers, to allow subscribers to receive pertinent information. We also have a public website for the 2010 Consumer Products Regulatory Work Group Activity.

The public process to evaluate the categories included in these proposed amendments began in July of 2007 with release of the 2006 Survey. The Survey (along with the 2008 Survey Update) provided detailed information on sales and product volatile organic compound (VOC) content which allowed for calculation of emissions and identified possible reformulation strategies to reduce VOC content.

To begin this rulemaking process, on August 15, 2008, staff posted data summaries for several cleaning product categories to the CPRWG activity website. Draft VOC limits for these categories were posted on August 22, 2008. The data and proposals were discussed at a public workshop on August 27, 2008. At the meeting, staff discussed the draft regulatory categories, proposed limits, and the rulemaking timeline. The meeting served as a forum for stakeholder comments on the proposals. Based on comments received, staff postponed consideration of the proposals to assess health impacts associated with potential reformulation strategies.

Staff continued review of the 2006 Survey and on October 19, 2009, data summaries were posted for the remaining 2006 Survey categories. Corrections to the data were made, as appropriate, based on stakeholder comments.

The data summaries were evaluated for potential VOC reduction opportunities. Based on this review, draft categories and VOC limits for various categories were posted to the CPRWG activity website on April 8, 2010. The data and proposals were discussed at a second public workshop on April 13, 2010. At the meeting, staff discussed the draft regulatory categories, proposed limits, and the rulemaking timeline. Stakeholders participated in person and *via* teleconference. Useful comments on the proposals were received. These comments led to additional evaluation of the survey data, and in some instances resulted in modifications to the proposal to ensure commercial and technological feasibility of each proposed limit.

To solicit additional information and comments, staff held individual meetings and teleconferences with stakeholders. At several of these meetings, industry representatives presented technical information related to reformulation of products.

A third public workshop to discuss the proposal was held on July 29, 2010. As with each of the previous public workshops, stakeholders participated in person and *via* teleconference. Prior to the public workshop materials to be discussed were posted to the 2010 CPRWG activity website. The proposal reflected some modifications based on comments received at earlier workshops.

REFERENCES

1. Air Resources Board. 2008 Consumer & Commercial Products Survey Update for Dry Clean Only Spot Removers. January 14, 2009. (ARB, 2009e)
2. Air Resources Board. 2006 Consumer & Commercial Products Survey (Including Aerosol Coating Products). July 24, 2007. (ARB, 2007e)

Chapter III. Statutory Requirements and the State Implementation Plan Commitment for Emission Reductions

In this chapter, we describe State law requirements related to setting volatile organic compound (VOC) and greenhouse gas (GHG) limits, and how our proposals meet these criteria. Interpretation of the terms commercially feasible and technologically feasible is provided. The commitment for consumer products in the 2007 State Implementation Plan (SIP), and progress to date, are also described.

A. VOC Reductions

Health and Safety Code section 41712 gives the Air Resources Board (ARB) authority to control emissions from a very diverse number of products sold statewide to household and commercial consumers. By law, "Consumer Product" means a chemically formulated product used by household and institutional consumers, including, but not limited to, detergents; cleaning compounds; polishes; floor finishes; cosmetics; personal care products; home, lawn, and garden products; disinfectants; sanitizers; aerosol paints; and automotive specialty products; but does not include other paint products, furniture coatings, or architectural coatings.

Section 41712 requires the Board to adopt regulations to achieve the maximum feasible reduction in VOCs emitted by consumer products after making certain determinations. Prior to adoption, the Board must determine that adequate data exist to establish that the regulations are necessary to attain State and national ambient air quality standards and the regulations are commercially and technologically feasible. Section 41712 also specifies that regulations cannot result in the elimination of a product form. Product form refers to the shape and/or structure of the product such as liquid; solid; powder; gel; crystal; aerosol; or pump spray.

The Board must consider the effect that the limits or requirements proposed for health benefit products will have on the efficacy of those products in killing or inactivating agents of infectious diseases such as viruses, bacteria, and fungi. In this regard, the Board must consult with health professionals when developing VOC control measures for health benefit products.

Section C provides the interpretation of the terms commercially and technologically feasible as they relate to setting VOC limits. During the early development of consumer product regulations, guidelines were established to ensure that these statutory criteria were met when setting limits. These guidelines and statutory criteria were followed in

developing the proposed amendments. Chapter V includes our rationale for why staff finds that the VOC limits meet these criteria.

B. Greenhouse Gas Reductions

Health and Safety Code section 38500 *et. seq.* (Assembly Bill 32) requires ARB to develop regulations and consider market mechanisms that will ultimately reduce California's greenhouse gas emissions equivalent to the 1990 levels by 2020. It required ARB to identify a list of "discrete early action greenhouse gas reduction measures" by June 30, 2007. Reduction of compounds with higher global warming potential (GWP) values that are used in consumer products was designated as one of these measures, and is part of the State's Scoping Plan.

In accordance with section 38562, certain criteria are to be met in developing regulations to meet GHG reduction goals. Among other things, the regulations must be equitable, minimize costs, and maximize the benefits to California. The GHG regulations are also required to be technologically feasible and cost-effective.

In this rulemaking, we are not proposing limits under the authority granted under Assembly Bill 32. We are, however, proposing a mitigation measure under authority granted by the California Environmental Quality Act to ensure that use of compounds with higher GWP values are not used to reformulate products to meet VOC limits.

C. Interpretation of the Terms Technological and Commercial Feasibility in Relation to Proposing VOC Limits

Staff bases proposals for VOC limits on the lower VOC content technologies reported within a product category, on technology transfer from other product categories, or on research into emerging technologies, that with lead time, will likely be feasible. In doing this, staff must ensure that the various product forms within each category will be preserved and that efficacy of health benefit products will not be affected. Our interpretation of the terms "technologically feasible" and "commercially feasible" follows.

1. Technologically Feasible

Health and Safety Code section 41712(b) requires that the Board adopt consumer product regulations that are "technologically feasible." Technological feasibility is a different concept than "commercial feasibility," and does not take into account the cost of reformulating a product. We believe that a proposed limit is technologically feasible if it meets at least one of the following criteria: (1) the limit is already being met by at least one product within the same category, or (2) the limit can reasonably be expected to be met in the time frame provided through additional development efforts.

In setting the proposed VOC limits, an effort was made, wherever possible, to ensure that multiple reformulation technologies exist which would allow products to comply. Proposed limits were set at VOC levels that staff determined could be met without

increased use of toxic air contaminants, greenhouse gases, or ozone-depleting compounds. General reformulation options include addition of exempt VOC solvents such as acetone, use of low vapor pressure (LVP)-VOC solvents, use of water-based technologies, use of VOC exempt propellants, increased use of surfactants, and use of inorganic compounds.

2. Commercially Feasible

Health and Safety Code section 41712(b) also requires the Board to adopt consumer product regulations that are “commercially feasible.” The term “commercially feasible” is not defined in State law. In interpreting this term, staff utilizes the reasoning employed by the United States Court of Appeals for the District of Columbia in interpreting the federal Clean Air Act. In the leading case of International Harvester Company v. Ruckelshaus, (D.C. Cir. 1973) 478 F. 2d 615, the Court held that the U.S. EPA could promulgate technology-forcing motor vehicle emission limits which might result in fewer models and a more limited choice of engine types for consumers, as long as the basic market demand for new passenger automobiles could be generally met.

Following this reasoning, we have concluded that a regulation is “commercially feasible” as long as the “basic market demand” for a particular consumer product can be met. “Basic market demand” is the underlying need of consumers for a product to fulfill a basic, necessary function. This must be distinguished from consumer “preference,” which may be towards specific attributes of a particular product. A “preference” is the choice of consumers for a certain product or products based upon fragrance, cost, texture, *etc.*

By way of example, a consumer has a basic market demand for a glass cleaner to remove soils, grease, dirt or grime from their windows. Glass cleaners may be formulated with glycol ether solvents or with ammonia. Consumers may choose an ammoniated glass cleaner because they prefer the performance characteristics, or they may choose a nonammoniated glass cleaner because they dislike the smell of ammonia. This distinction is not recognized by all parties. Some stakeholders have expressed the view that consumers do not have a “basic market demand” for a general class of products, but that consumers instead have a number of separate and distinct “basic market demands” for many specialty products with differing characteristics.

ARB staff believes the consumer “preference” interpretation of “basic market demand” is inconsistent with the reasoning from the International Harvester case. To adopt such a narrow interpretation would be inconsistent with the clearly expressed legislative intent that “...the State board shall adopt regulations to achieve the maximum feasible reduction in reactive organic compounds emitted by consumer products...” (Health and Safety Code section 41712(a)). In order to achieve emission reductions, manufacturers of noncomplying products which perform the same basic function as complying product counterparts must reduce the amount of VOCs in their products. It is expected that when a product’s formulation changes, some attributes of the product will also change.

If ARB were to establish limits which accounted for every distinct feature of every product, then each product would require a limit unto itself. Using this approach, it would be impossible to achieve the maximum feasible reduction in VOC emissions.

Most currently marketed products have some unique features that differentiate them from other products. Consumers who purchase a product have demonstrated a preference over other competing products. This distinction between “preference” and “basic market demand” was clearly made in the International Harvester case. In the International Harvester case, the court stated that the proposed emission limits would be feasible even though they may result in the unavailability of certain kinds of vehicles and engine types people preferred, as long as the basic market demand for passenger cars could be generally met. Applying this principle to consumer products, the proposed amendments allow the basic market demand to be met for each product category, even though it may no longer be possible to manufacture products with some specific attributes. ARB staff believes that this approach complies with Health and Safety Code section 41712.

Chapter V of this report provides the rationale of why we believe the amendments proposed in this rulemaking meet these criteria.

D. State Implementation Plans

The Board must also meet its obligations under the SIP. Because VOCs are ozone precursors, specific consumer product control measures have been developed and included in SIPs to meet the previous one-hour peak ozone standard, as well as the eight-hour ozone standard. To meet the national standards, emission reductions from consumer products became part of the SIP for ozone in 1994. In this SIP, consumer products measures were put in place to work towards attaining the federal one-hour ambient air quality standard for ozone. In the 2003 SIP, ARB reiterated the commitment to reduce consumer products’ VOC emissions to meet the one-hour federal ozone standard. Our summary here focuses on the current consumer product element designed to meet the 0.08 parts per million (ppm) eight-hour ambient air quality standard for ozone (ARB, 2008b).

1. The 2007 SIP Commitment for Consumer Products

In 2007, a new SIP was adopted. This State Strategy for California’s 2007 State Implementation Plan continues California’s approach to attaining the federal ozone standard of 0.08 ppm averaged over eight hours (ARB, 2007d). The consumer products commitment in this SIP, to reduce VOC emissions by 30-40 tons per day statewide, supplements the 1994 and 2003 commitments. Table III-1 displays the progress toward meeting the January 1, 2014, deadline. Once fully effective the adopted limits from the 2008 and 2009 rulemakings will reduce VOC emissions by 19.2 tons per day.

**Table III-1
Consumer Product SIP Commitment and Progress to Date**

Consumer Products Rulemaking	Statewide VOC Reductions (tons per day)
June 2008 Amendments	4.5 (adopted)
September 2009 Amendments	14.7* (adopted)
2010 Amendments (this proposal)	6.7 (proposed)
Additional Reductions from Consumer Product Categories	~ 4.0 – 14.0 (needed)
Total Reductions by January 1, 2014	30 – 40

* Emission reductions of about 12.7 tons per day of this reduction occur in all areas of the State except the South Coast Air Quality Management District (district has their own rule, Rule 1143, for Paint Thinners and Multi-purpose Solvents) (ARB, 2009c).

The amendments proposed in this rulemaking are the third increment toward fulfilling the 2007 SIP commitment for VOC reductions from consumer products. As shown in Table III-1, the proposal described in this report is designed to achieve a VOC reduction of about 6.7 tons per day statewide. Table III-1 also shows that additional rulemakings to complete the commitment are necessary.

Further reductions from consumer products are important because VOC emissions from consumer products are predicted to become the largest source of VOC emissions in the South Coast Air Basin, and the third largest source in the San Joaquin Valley Air Basin by 2020. The SIP, in combination with local actions, provides emission reductions necessary to meet the eight-hour ozone standard in these two most challenging regions.

VOC reductions from consumer products are becoming more difficult to achieve. In light of this, the SIP includes a commitment to explore innovative reduction approaches in the longer term. One such measure would include investigating emission reduction opportunities through reactivity-based standards.

Alternative market-based mechanisms would also be explored to encourage the development, distribution, and purchase of cleaner, very low, or zero VOC emitting products. Examples of mechanisms to explore are an environmental product labeling program, programs where companies set their own emission reduction goals, and the use of print and broadcast media for public education. If these mechanisms cannot produce meaningful emission reductions from the consumer products source category, then other approaches would be evaluated. Some of these other approaches include the purchase of VOC emission reduction credits; and funding of special projects to reduce emissions or accelerate reductions from pollution sources outside of the consumer products industry.

2. Future SIPs

Up-to-date information on SIP activities can be found on ARB's website at: <http://www.arb.ca.gov/planning/sip/sip.htm>. Effective May 27, 2008, U.S. EPA reduced the eight-hour "primary" ozone standard to a level of 0.075 ppm. U.S. EPA also set a secondary eight-hour ozone standard to the level of 0.075 ppm, making it identical to the revised primary standard. As of this writing these standards have been withdrawn and are being reconsidered. U.S. EPA proposed that the new primary standard be in the range of 0.060-0.070 ppm. The final rule is expected by late October of this year (2010). Revisions to the current eight-hour standard will require that new SIPs be drafted. A complete new State strategy will be developed for 2013 (U.S. EPA, 2010c). The 2013 SIP will likely require more VOC reductions from consumer products.

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1. Air Resources Board. Initial Statement of Reasons, Proposed Amendments to the California Consumer Products Regulations. August 7, 2009. (ARB, 2009c)
2. Air Resources Board. Ambient Air Quality Standards. April 1, 2008. (ARB, 2008b)
3. Air Resources Board. State Strategy for California's 2007 Implementation Plan. Released April 26, 2007. Adopted by the Air Resources Board on September 27, 2007. (ARB, 2007d)
4. International Harvester Company v. Ruckelshaus General Motors Corporation, 478 F. 2d 615 (D.C. Cir., 1973)
5. United States Environmental Protection Agency. National Ambient Air Quality Standards for Ozone (40CFR Parts 50 and 58). Federal Register: January 19, 2010. Volume 75, Number 11. (U.S. EPA, 2010c)

Chapter IV. Air Pollutants, Area Designations, and Consumer Products' Emissions

California's extreme air quality problems require unique strategies for improving air quality and slowing climate change. For example, nearly all Californians, or about 99 percent, live in areas designated as nonattainment for the State's ozone and/or particulate matter (PM) standards (ARB, 2009a). In this chapter, we provide an overview of air quality focusing on criteria pollutants and climate change problems which are germane to the regulation of consumer products. This chapter also includes a summary of national and State ambient air quality standards and displays areas of the State that are not in attainment with these standards. Information on consumer products emissions and emission trends is also provided.

A. Criteria Pollutants

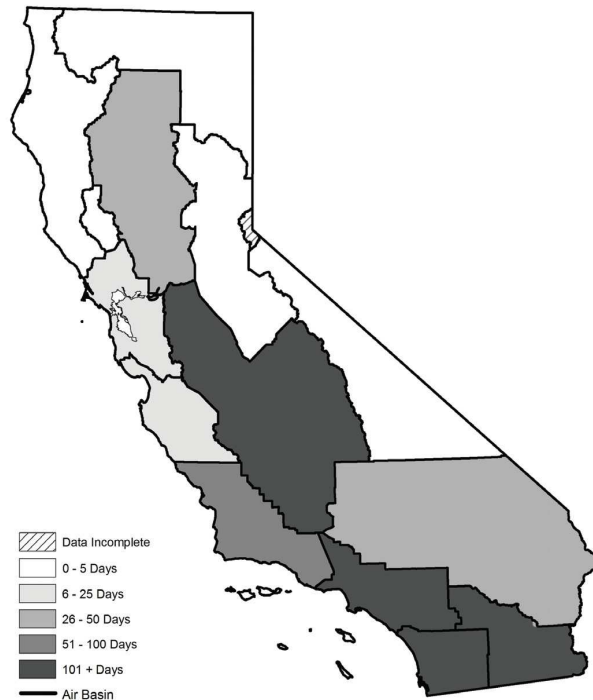
National and State ambient air quality standards have been established to protect California's population from the harmful effects of ozone and PM. An ambient air quality standard sets legal limits on the level of an air pollutant in the outdoor (ambient) air that has been deemed necessary to protect public health. Both ARB and U.S. EPA are authorized to set standards.

Volatile organic compound (VOC) emissions from consumer products contribute to the formation of both ozone and fine PM. Other sources of VOCs include emissions from fuel combustion and various paint products. PM pollution is the result of both direct and indirect emissions. Direct sources of PM include emissions from fuel combustion and wind erosion of soil. Indirect PM emissions result from the chemical reaction of VOCs, nitrogen oxides (NO_x), sulfur oxides, and other chemicals in the atmosphere. Emissions from consumer products are indirect sources of PM.

1. Ozone

Ozone formation in the lower atmosphere results from a series of chemical reactions between VOCs and NO_x in the presence of sunlight. The rate of ozone generation is related closely to both the amount and reactivity of VOC emissions as well as the amount of NO_x emissions available in the atmosphere (Seinfeld and Pandis, 1998). Ozone is a colorless gas and the chief component of urban smog. It is one of the State's most persistent air quality problems. Over 90 percent of the State's population lives in areas where the State's eight-hour ozone standard is exceeded (ARB, 2006b). Figure IV-1 below displays, by air basin, the number of days in 2007 that the State's eight-hour ozone standard was exceeded.

Figure IV-1
Number of Days the State Eight-Hour Ozone Standard was Exceeded in
Each Air Basin During 2007



As shown in Figure IV-1, large areas of the State experience over 50 days per year of unhealthy air due to ground-level ozone concentrations that exceed the State standard.

It has been well documented that ozone adversely affects the respiratory function of humans and animals. Research has shown that, when inhaled, ozone can cause respiratory problems, aggravate asthma, impair the immune system, and cause increased risk of premature death. Human health studies show that short-term exposure to ozone injures the lung (ARB, 2008b). In some animal studies, permanent structural changes with long-term exposures to ozone concentrations considerably above ambient were seen; these changes remain even after periods of exposure to clean air (U.S. EPA, 2006). Exposure to levels of ozone above the current ambient air quality standard can lead to lung inflammation, lung tissue damage, and a reduction in the amount of air inhaled into the lungs.

Ozone is a strong irritant that can cause constriction of the muscle cells in the airways that result in symptoms such as coughing, chest tightness, shortness of breath, and increased asthma symptoms (ARB, 2008b). Recent evidence suggests that ozone may be linked to the onset of new asthma in very active children (McConnell *et al.*, 2002). Ozone has also been associated with premature death. Ozone in sufficient doses can

also increase the permeability of lung cells, rendering them more susceptible to toxins and microorganisms. Other health effects associated with ozone exposure include hospitalizations and school absences. The greatest risk from ozone exposure is to those who are active outdoors during smoggy periods, such as children, athletes, and outdoor workers.

Not only does ozone adversely affect human and animal health, but it also affects vegetation, resulting in reduced yield and quality in agricultural crops, disfiguration or unsatisfactory growth in ornamental vegetation, and damage to native plants. During the summer, ozone levels are often highest in the urban centers in Southern California, the San Joaquin Valley, and Sacramento Valley, which are adjacent to the principal production areas in the State's multibillion-dollar agricultural industry (USDA, 2010). ARB studies indicate that ozone pollution damage to crops is estimated to cost agriculture over \$500 million dollars annually (ARB, 1987; ARB, 2006b).

2. Fine Particulate Matter

Particulate matter is a complex mixture of tiny particles that may consist of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These particles vary greatly in shape, size, and chemical composition, and can be made up of many different materials such as metals, soot, soil, and dust. As described above, PM can be directly emitted from sources, such as diesel PM, or can be produced indirectly from sources which emit precursors that are converted to PM by atmospheric processes. Particles 10 micrometers or less in diameter are defined as "respirable particulate matter" or "PM₁₀." PM₁₀ and particles 2.5 micrometers or less in diameter (PM_{2.5}) can be inhaled deep into the lungs. PM_{2.5} contributes significantly to regional haze and reduction of visibility in California. Besides reducing visibility, the acidic portion of PM (nitrates, sulfates) can harm crops, forests, aquatic and other ecosystems (ARB, 2002).

Considerable epidemiologic research over the past 15 years has investigated the responses of humans to PM. The principal health effects of PM exposure are summarized below:

- Many studies have consistently found statistical associations between PM_{2.5} and premature death with both long-term (Pope *et al.*, 2004; Pope *et al.*, 2002; Krewski *et al.*, 2000; Laden *et al.*, 2006) and daily exposures (e.g., Dominici *et al.*, 2005; Dominici *et al.*, 2003; Laden *et al.*, 2000). The association with premature mortality is considerably stronger for annual average PM_{2.5} exposure than for daily average PM_{2.5}. That is, long-term exposure appears to pose a greater risk of death than short-term exposure.
- A recent study suggests that long-term exposure to PM_{2.5} may influence the risk of adverse cardiovascular events in women (Miller *et al.*, 2007), including hospitalization or death from heart attack or stroke.

- Daily exposure to PM_{2.5} has been associated with hospitalization for heart and lung related causes (Moolgavkar, 2003; Zanobetti and Schwartz, 2003). Others have found that exposure to PM_{2.5} resulted in increased emergency room visits, exacerbation of asthma, and other respiratory diseases (Peel *et al.*, 2005; Sheppard, 2003). Other research indicates that exposure to PM_{2.5} leads to increased asthma medication usage (Gent *et al.*, 2003), and increased asthma symptoms (e.g., Delfino *et al.*, 2002; Whittemore and Korn, 1980). Exposure to PM_{2.5} has also been associated with an increase in the loss of work days (Ostro *et al.*, 1993; Ostro and Rothschild, 1989).
- Older adults with pre-existing chronic heart or lung disease are at greatest risk of experiencing adverse effects related to PM_{2.5} exposure (Moolgavkar, 2003; Dominici *et al.*, 2006; Symons *et al.*, 2006).

There is some evidence that PM and ozone may have greater effects in children than in adults. This may be because they inhale more PM_{2.5} and ozone per pound of body weight than do adults, and because they breathe more rapidly than adults. Adverse effects reported in children include reduced lung function and reduced lung growth in higher pollution areas (Gauderman *et al.*, 2004; Gauderman *et al.*, 2002; Gauderman *et al.*, 2000) that may at least partially reverse if the child moves to an area with cleaner air (Avol *et al.*, 2001); increased asthma and bronchitis symptoms (Gauderman *et al.*, 2005; McConnell *et al.*, 1999); increased school absenteeism (Gilliland *et al.*, 2001); and increased risk of acquiring asthma for children who engage in three or more outdoor sports and live in areas with high ozone concentrations (McConnell *et al.*, 2002).

B. Ambient Air Quality Standards

To protect public health California has set two standards for ozone. The one-hour peak standard for ozone is 0.09 parts per million (ppm). The eight-hour standard for ozone is 0.070 ppm averaged over eight hours. The PM₁₀ annual average standard is 20 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) and the annual average PM_{2.5} standard is 12 $\mu\text{g}/\text{m}^3$. The State PM₁₀ standard for a 24-hour period is 50 $\mu\text{g}/\text{m}^3$. The national and State ambient air quality standards for ozone and PM are shown in Table IV-1.

Table IV-1 reflects the previous national eight-hour standard for ozone of 0.08 ppm. This is because the 0.075 ppm standard, promulgated on March 27, 2008, is being reconsidered. It is expected that the revised primary standard will be set within the range of 0.060 to 0.070 ppm to provide increased protection for children and other 'at risk' populations (U.S. EPA, 2010c). The final rule on the national standard is expected in October of this year. Table IV-1 shows that California's standards for PM and ozone continue to be more health protective than those at the federal level.

Table IV-1
Ambient Air Quality Standards for Ozone, PM₁₀ and PM_{2.5}

Pollutant	Averaging Time	State Standard	National Standard
Ozone	1 hour	0.09 ppm (180 µg/m ³)	-----*
	8 hour	0.070 ppm (137 µg/m ³)	0.08 ppm** (157 µg/m ³)
PM ₁₀	24 hour Annual Arithmetic Mean	50 µg/m ³ 20 µg/m ³	150 µg/m ³ -----
PM _{2.5}	24 hour Annual Arithmetic Mean	----- 12 µg/m ³	35 µg/m ³ 15.0 µg/m ³

Source: Air Resources Board, Ambient Air Quality Standards April 1, 2008 (ARB, 2008b).

* The federal one-hour standard was revoked on June 15, 2005.

** The previously promulgated standard of 0.075 ppm is being reconsidered. The 2007 SIP is designed to reach attainment with the standard of 0.08 ppm (U.S. EPA, 2010c).

1. Area Designations for California Ambient Air Ozone Standard

The California Clean Air Act (CCAA) of 1988 has the fundamental goal that all areas of California are to attain the State ambient air quality standards for ozone by the earliest practicable date. As specified in the CCAA, ARB has designated areas of California to be in "attainment" or "nonattainment" for the State ozone standards.

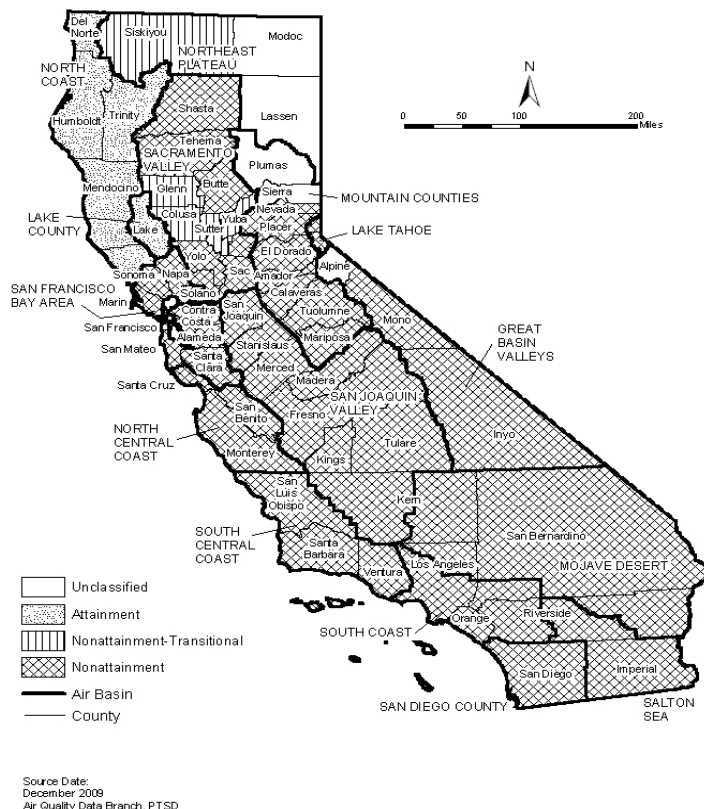
For the year 2010, Figure IV-2 shows the counties designated as nonattainment (or nonattainment transitional, which is a subcategory of nonattainment) for the State ozone standard. As shown, unhealthy levels of ozone are not limited to urban areas, but can be found in nearly every county in California. This map clearly indicates the extent and magnitude of the ozone problem in California.

Some of the areas that are nonattainment for the State ozone standards are also nonattainment for the 0.08 ppm federal eight-hour ozone standard. SIPs showing how each nonattainment area would meet the 0.08 ppm eight-hour ozone standard were submitted to U.S EPA in 2007. In order to maintain progress towards clean air, the federal Clean Air Act prohibits backsliding on the control program.

2. Area Designations for California Ambient Air PM_{2.5} Standard

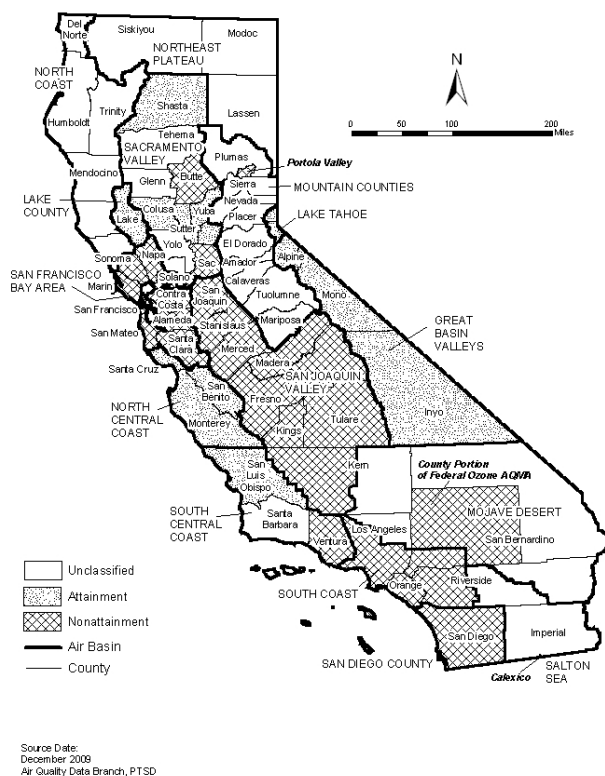
Figure IV-3 shows the counties designated as nonattainment for the State PM_{2.5} standard. As with ozone, unhealthy levels of PM_{2.5} are not limited to urban areas, but can be found in many counties throughout California.

Figure IV-2
Area Designations for State Ambient Air Quality Standard for Ozone



Nonattainment areas for the federal 24-hour $PM_{2.5}$ standard of $35 \mu g/m^3$ include the South Coast Air Quality Management District (SCAQMD); San Joaquin Valley Air Pollution Control District (SJVAPCD); Bay Area Air Quality Management District; Sacramento Metropolitan Air Quality Management District; and portions of the El Dorado County Air Quality Management District, Placer County Air Pollution Control District, Yolo/Solano Air Quality Management District, Feather River Air Quality Management District, Butte County Air Quality Management District, and Imperial County Air Pollution Control District. Thus, most of the areas shown in Figure IV-3 are also nonattainment for the federal 24-hour $PM_{2.5}$ standard. SIPs are due to U.S. EPA for the federal 24-hour $PM_{2.5}$ standard of $35 \mu g/m^3$ in 2012.

Figure IV-3
Area Designations for State Ambient Air Quality Standard for PM_{2.5}



SIPs for the federal PM_{2.5} annual standard of 15.0 µg/m³ were due to U.S. EPA in 2008. The PM_{2.5} SIP for SCAQMD was approved by the Board in September 2007 and was submitted to U.S. EPA in November 2007. The PM_{2.5} SIP for SJVAPCD was approved by the Board in May 2008 and was submitted to U.S. EPA in June 2008.

C. Climate Change

Climate change, or global warming, is the process whereby emissions of anthropogenic pollutants, together with other naturally-occurring gases, absorb infrared radiation in the atmosphere, leading to increases in the overall average global temperature. Changes in the atmospheric abundance of greenhouse gases (GHG) alter the energy balance of the climate system. These changes are expressed in terms of radiative forcing. The standard definition of “greenhouse gas” includes, but is not limited to, six substances as

identified in the Kyoto Protocol; carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆).

The Global Warming Potential (GWP) of a compound may reflect a direct effect as well as an indirect effect on global warming. The direct effect is the warming due to the absorption of radiation by molecules of the compound in question. VOCs, CO₂, and HFCs all have direct effects. The indirect effect is due to the impact that the presence of the compound has on the concentration of other GHGs. For example, VOCs contribute indirectly to global warming, because they react chemically in the atmosphere to increase GHG concentrations of ozone and methane. While VOCs do have direct effects, they are considered GHGs primarily because of their role in creating ozone, and in prolonging the life of methane in the atmosphere.

By convention, the GWP index is defined relative to CO₂ which has a GWP of 1. The Second Assessment Report (SAR) (IPCC, 1996), defines the GWP of a GHG as the ratio of the time-integrated radiative forcing impact from an instantaneous release of 1 kilogram (kg) of a trace substance relative to that of 1 kg of CO₂. The standard units of measurement used to express the emissions of a GHG is, million metric tons of CO₂ equivalents (MMT CO₂e) per year.

The GWP values used by ARB are generally the 1996 SAR GWP values (ARB, 2007c). These values are used when converting emissions of GHGs to CO₂ equivalent values (CO₂e). The SAR GWP values are used to be consistent with the Board's Discrete Early Action Report, other statewide and national GHG inventories, and ARB's Scoping Plan. When no SAR GWP value is listed, ARB uses the 2007 Fourth Assessment Report (FAR) GWP value (IPCC, 2007).

The climate warming impact from emissions of GHGs is the product of two factors: (1) the mass of GHG emitted, and (2) its warming potential. In addition to uncertainty in the mass of emissions, there is also uncertainty in attributes of warming potential (as a function of direct and indirect warming impacts and the atmospheric lifetime) and thus in the assessment of GWP.

D. Consumer Product Emissions

Consumer products are a significant source of VOC emissions in California. These VOC emissions also contribute to secondary organic aerosol formation. The contribution of consumer products to overall GHG emissions is modest relative to other sources, such as vehicle exhaust. This section focuses on emissions of VOCs and GHGs.

1. VOC Emissions

Although each consumer product may seem to be a small source of emissions, the cumulative use of these products by over 39 million Californians results in significant

emissions (ARB, 2009a). Given the severity of the air pollution problems in California, further dramatic emission reductions from all sources contributing to ground-level ozone are necessary.

As evidence of the magnitude of consumer product VOC emissions, it is estimated that current (2010) consumer products emissions are approximately 245 tons per day, or about 12 percent of the overall statewide VOC inventory. Consumer product emissions comprise about 18 percent and 7 percent of VOC emissions in SCAQMD and SJVAPCD, respectively. Without further actions, consumer product emissions are expected to grow to approximately 270 tons per day in 2020, representing about 14 percent of statewide VOC emissions (ARB, 2009a).

As control measures for other VOC sources (i.e. mobile sources) become effective, consumer product emissions become more important. For example, it is estimated that emissions from consumer products will be the largest source of VOC emissions in the SCAQMD in 2020. Given this, further reductions in VOC emissions from consumer products are needed, if ozone attainment is to be achieved and maintained.

Despite these projections, ARB's consumer products program has made significant progress. Since 1989, regulations adopted by the ARB, along with numerous amendments to the regulations, have substantially reduced VOC emissions from consumer products. Absent these regulations today, consumer product emissions would likely be about 450 tons per day. Figure IV-4 shows that statewide consumer product VOC emissions will have been reduced by over 225 tons per day by 2013. However, Figure IV-4 also shows that without further actions population growth would likely reverse the trend.

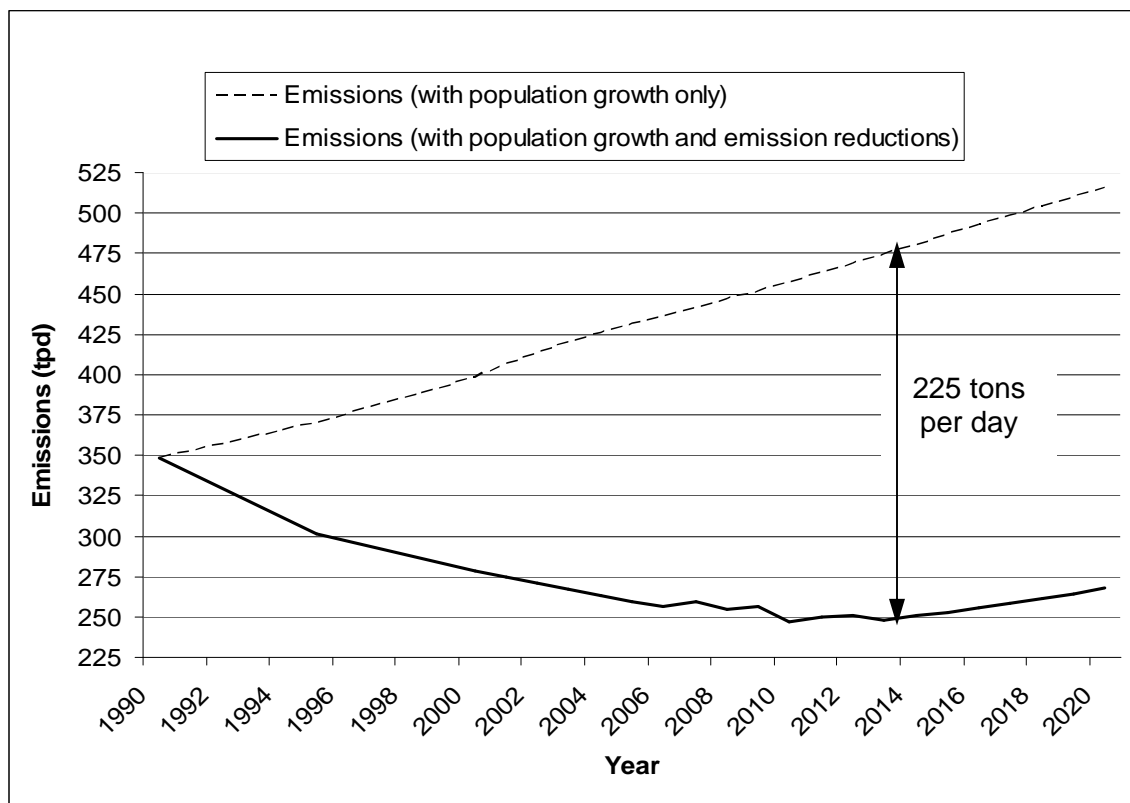
The emission values in Figure IV-4 are derived from several data sources. The 1990 to 2007 emissions are taken from the ARB Forecasted Emissions by Summary Category, 2009 Almanac (ARB, 2007a; ARB, 2009b). Emissions are then grown in proportion to expected population increase. Population growth is in accordance with estimates in the California Environmental Protection Agency's (Cal/EPA) Statewide Human Population Table found in the Population and Vehicle Trends Report (ARB, 2008c). For categories regulated by the 2009 Consumer Products Regulation Amendments, emission values from the 2006 Survey and estimated emission reductions resulting from the VOC limits approved by the Board at its September 2009, hearing, are reflected in the figure (ARB, 2009c). As shown in Figure IV-4, the important emission reductions that have been realized from the ARB's Consumer Products Program will, in 2014, begin to be offset by population growth. California's population is expected to grow to 40 million by 2012 (CA DOF, 2007). Therefore, ARB must continue its commitment to pursue additional technologically and commercially feasible consumer products emission reductions.

2. Greenhouse Gas Emissions

Several GHGs are used in consumer products. Compounds of interest include CO₂, N₂O, HFCs, hydrochlorofluorocarbons, and hydrofluoroethers. However, the

propellants CO₂, HFC-134a, and HFC-152a are the predominate GHGs used in consumer products today. The propellants HFC-134a and HFC-152a are low

Figure IV-4
Consumer Products VOC Emission Trends



photochemically reactive compounds that are VOC exempt; they have been used as a reformulation strategy to reduce VOC content in other categories. CO₂ is not a VOC.

Using the second assessment report for GWP values, HFC-152a has a GWP of 140, while HFC-134a has a GWP of 1,300. The value for HFC-134a is approximately ten times greater than the GWP of HFC-152a and 1,300 times greater than CO₂. Thus, consumer product emission reduction strategies have primarily focused on restricting the use of HFC-134a.

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Chapter V. Development of the Proposed VOC Limits

In Chapter III information on statutory requirements and the State Implementation Plan (SIP) commitment was provided. Chapter IV focused on California's air quality problems to demonstrate why there is a need to control emissions from consumer products. This chapter describes the development of the proposed limits and why we believe the limits are commercially and technologically feasible, and necessary. The following information is included:

- surveys conducted to estimate emissions in categories proposed for regulation;
- emissions from categories proposed for regulation;
- proposed volatile organic compound (VOC) limits and reductions resulting if the limits are adopted;
- commercial and technological feasibility of the proposed VOC limits;
- general reformulation strategies for noncomplying products;
- necessity of achieving the reductions; and
- alternative regulatory proposals considered.

A. Surveys, Estimated Emissions, and Reductions from Categories Proposed to be Regulated

In this section, we provide an overview of the surveys used to develop these proposed amendments. The survey data are used to estimate VOC and greenhouse gas (GHG) emissions from consumer products and evaluate opportunities for reductions. The categories, emissions, and proposed limits are also provided.

1. Consumer and Commercial Products Surveys

The 2006 Consumer and Commercial Products Survey was mailed to over 5,000 companies in July 2007. The 2008 Dry Clean Only Spot Remover Survey Update (2008 Survey Update) was sent to companies in January 2009. Over 570 companies responded to the 2006 Survey with information on over 12,000 products (ARB, 2007e). Eight companies responded to the 2008 Survey Update with information on about 50 products (ARB, 2009e). The surveys were designed to obtain the comprehensive information necessary to develop new consumer product emission standards. Data received from these surveys formed the basis for the emissions used in this rulemaking.

The 2006 Survey and 2008 Survey Update provided staff with detailed information on the formulations of consumer products proposed for regulation, including complete

speciation of VOCs, low vapor pressure VOC (LVP-VOC) solvents, GHGs, and key exempt ingredients (ARB, 2007e; ARB, 2009e). Total volumes of inorganic and other compounds were also provided. Information on sales, product form, customer types, and company size and economics was also obtained.

Data summaries from the 2006 Survey and 2008 Survey Update were posted to the website and input from industry was used to correct inaccuracies in the data. For this rulemaking, the emissions data from the 2006 Survey and the 2008 Survey Update were grown by population to predict current year emissions (2010). Reported emissions were assumed to account for 90 percent of overall emissions. Data were also grown to ensure complete market coverage. Emission reduction estimates were grown to the date the limits become effective. The basis for these adjustments is the estimates in the California Environmental Protection Agency's (Cal/EPA) Statewide Human Population Table found in the Population and Vehicle Trends Report (ARB, 2008c).

Staff is confident that the 2006 Survey and 2008 Survey Update had adequate representation of the available technologies in the market place for the categories proposed for regulation and finds that the data meet the requirement in Health and Safety Code section 41712(b) to base regulations on "adequate data." This assumption has been verified through data review by manufacturers, category research, shelf surveys, and the wide range of VOC content reported for products in the categories proposed for regulation.

2. Staff Evaluation of Emission Reduction Opportunities

Development of the proposed amendments began with review of the survey data. In developing these proposals, staff worked with stakeholders on each category proposed for regulation. Numerous product labels and associated literature for each category were analyzed. Category information was also obtained from shelf surveys, trade journals, Internet sites, textbooks, patents, and directly from manufacturers.

In developing the proposed amendments, staff reorganized survey categories based on similarities or other criteria. Staff further developed the proposed VOC limits for product categories based on technical information provided by stakeholders and staff's research efforts.

As part of the public process, we presented specific proposals and alternatives to the public for consideration. Modifications were made to the original proposal after consideration and evaluation of comments.

3. VOC Emissions, Proposed Categories, and Limits

Based on the process described above, staff is proposing VOC limits for 11 categories. Table V-1 displays the statewide VOC emissions from the categories proposed for regulation. As shown in Table V-1, 2010 emissions are estimated to be about 21.7 tons per day. The table also includes the proposed VOC limit and emission reduction

**Table V-1
Proposed VOC Limits, Emissions, and Reductions at Effective Date**

Product Category	Product Form	2010 VOC Emissions* (tons per day)	Proposed VOC Limit (weight %)	VOC Reduction** (tons per day)
Flying Bug Insecticide	Aerosol	0.65	20	0.06 ⁺
Furniture Maintenance Product	Aerosol	1.32	12	0.36
General Purpose Cleaner	Nonaerosol	12.04	0.5	3.73 ⁺
General Purpose Degreaser	Nonaerosol	1.91	0.5	1.17
Glass Cleaner	Nonaerosol	3.34	3	0.41
Heavy-duty Hand Cleaner or Soap	Nonaerosol	0.79	1	0.53
Metal Polish or Cleanser	Aerosol	0.22	15	0.07
Metal Polish or Cleanser	Nonaerosol	0.20	3	0.15
Oven or Grill Cleaner	Aerosol	0.08	8	>0.0
Oven or Grill Cleaner	Nonaerosol	0.24	4	-0.12
Special-purpose Lubricant	Aerosol	0.26	25	0.10
Special-purpose Lubricant	Nonaerosol	0.18	3	0.13
Spot Remover (Dry Clean Only)	Aerosol	>0.0	15	>0.0
Spot Remover (Dry Clean Only)	Nonaerosol	0.17	3	0.17
Wasp or Hornet Insecticide	Aerosol	0.31	10	0.14 ⁺
Total Emissions 2010		21.7 tons per day		
Total VOC Reductions Creditable Toward 2007 SIP		6.7 tons per day		
Total VOC Reductions Creditable Toward Future Commitment		0.2 tons per day		

* Survey emissions adjusted for market coverage and grown to 2010 based on population

** Emission reductions grown to effective date based on population

⁺ Products subject to FIFRA registration requirement given an extra year to complete the registration process

at the date the proposed limits become effective. If adopted, VOC emission reductions from the limits that become effective prior to January 1, 2014, will be approximately 6.7 tons per day. An additional reduction of about 0.2 tons per day would be realized by the end of 2014. Although important to overall air quality, these reductions from Flying

Bug and Wasp or Hornet Insecticide products will not occur within the timeframe to be credited toward the current SIP commitment.

4. Greenhouse Gas Emissions

The GHGs reported in the categories proposed for regulation include CO₂, hydrofluorocarbon-152a (HFC-152a), and hydrochlorofluorocarbon-141b (HCFC-141b). Reported emissions, in pounds per year, for CO₂ are 41,145; for HFC-152a are 34,646; and for HCFC-141b are less than one pound per day. In combination, this is less than 0.01 million metric tons per year of CO₂ equivalents (MMT CO₂e).

B. Commercial and Technological Feasibility of the Proposed VOC Limits

In accordance with State law staff must demonstrate that the limits are commercially and technologically feasible. Useful measures for evaluating feasibility are the number of products that currently comply with the proposed limits and/or the market share, based on sales, of those products. As shown in Table V-2, the complying market shares (except where confidential) range from about 5 percent to over 95 percent. For each category proposed for regulation, there are products on the market which currently comply. Where there is low complying market share, lower emission technology exists that can provide a pathway for compliance. Based on the complying market share and/or the number of complying products in each category, staff believes the proposed VOC limits are commercially and technologically feasible.

In categories where the complying market share is low, staff has determined that the proposed effective dates will allow adequate time to successfully reformulate and bring products to market. Table V-2 also shows that for many categories separate limits have been proposed based on product form. This approach ensures that the proposed limits do not eliminate a product form, but also maximizes the reductions that are commercially and technologically feasible.

C. Options for Complying with the Proposed VOC Limits

Manufacturers of noncomplying products have the flexibility to choose from a variety of formulation options to meet the applicable limits. The reformulation options vary with each product category and are discussed in greater detail for each category in Chapter VII. To comply with VOC limits, VOC solvents or propellants will need to be replaced, or partially replaced, with non-VOC ingredients. This may require using water, exempt VOC compounds, substituting LVP-VOCs, increasing use of surfactants, increasing product solids, or formulating with a non-VOC propellant. Manufacturers may also need to change the valve, container, delivery system, or other components of the consumer product depending on the individual formulation. ARB staff has proposed

Table V-2
Summary of Complying Products and Complying Market Shares

Product Category	Product Form	Proposed VOC Limit (weight %)	Number of Complying Products/Total Products	Complying Market Share (%)
Flying Bug Insecticide	Aerosol	20	18 / 51	55
Furniture Maintenance Product	Aerosol	12	37 / 87	10
General Purpose Cleaner	Nonaerosol	0.5	980 / 1518	69
General Purpose Degreaser	Nonaerosol	0.5	232 / 462	73
Glass Cleaner	Nonaerosol	3	165 / 298	10
Heavy-duty Hand Cleaner or Soap	Nonaerosol	1	113 / 255	30
Metal Polish or Cleanser	Aerosol	15	20 / 73	35
Metal Polish or Cleanser	Nonaerosol	3	96 / 154	78
Oven or Grill Cleaner	Aerosol	8	18 / 21	87
Oven or Grill Cleaner	Nonaerosol	4	81 / 90	> 95
Special-purpose Lubricant	Aerosol	25	64 / 168	47
Special-purpose Lubricant	Nonaerosol	3	166 / 224	97
Spot Remover (Dry Clean Only)	Aerosol	15	<5 / <5	<5
Spot Remover (Dry Clean Only)	Nonaerosol	3	16 / 49	46
Wasp or Hornet Insecticide	Aerosol	10	38 / 56	60

Source: 2006 Consumer and Commercial Products Survey (2006 Survey) and 2008 Survey Update for Dry Clean Only Spot Removers (Survey Update) grown to 2010 based on population

VOC limits that can be met without the increased use of toxic air contaminants, GHGs with higher GWP values, and certain surfactants.

In general, we believe that aerosol products can and will be reformulated by reducing the amount of hydrocarbon propellant or using non-VOC propellants such as HFC-152a or CO₂. Some modification to the valve/spray nozzle may also be needed. The VOC solvents will likely be replaced with LVP-VOC, or VOC exempt solvents.

For nonaerosol products, developing water-based formulations is the most likely reformulation option for manufacturers of noncomplying products. We believe that VOC

solvents will be replaced with VOC exempt compounds; LVP-VOCs, such as methyl esters, glycol ethers, and hydrocarbons; surfactants; and/or inorganic compounds.

Several reformulation options warrant further discussion.

LVP-VOC Glycol Ethers

Stakeholders, as well as ARB staff, had concerns that reformulations to comply with the VOC limits for various cleaning products could result in use of certain compounds that may pose adverse health impacts. Staff evaluated various reformulation options and identified use of LVP-VOC glycol ethers as one of several reformulation options. To fully evaluate whether use of LVP-VOC glycol ethers would pose potential health hazards, ARB staff consulted with the Office of Environmental Health Hazard Assessment (OEHHA).

Based on available health effects data OEHHA developed draft provisional Reference Exposure Levels (REL) for a number of LVP-VOC glycol ethers. A REL is a concentration in air that is considered safe. However, due to lack of publicly available health effects data, large uncertainty factors were applied to the RELs. Further analysis by OEHHA determined that the RELs should not be used as a basis for regulatory action due to an overall lack of information on the toxicity of these compounds. OEHHA will continue to monitor developments in the toxicological literature and will re-evaluate the provisional RELs in the future, if needed (OEHHA, 2010).

In addition, based on staff's ongoing analysis of reformulation approaches we have concluded that use of these compounds is neither necessary, nor the preferred reformulation approach. This is because a large share of products that already comply with the proposed VOC limits for "General Purpose Cleaner" and "General Purpose Degreaser" do not rely on use of LVP-VOC glycol ethers. We also believe the proposed VOC limit for "Glass Cleaner" products is set at a level such that use of LVP-VOC glycol ethers is not needed. Nevertheless, we will monitor use of the LVP-VOC glycol ethers through regular surveys of the industry.

Acetone

Staff has identified use of acetone as a potential reformulation option in specific categories. Acetone is a low photochemically reactive compound that has been excluded from the definition of VOC. However, concerns with its use have been raised because it is an extremely flammable solvent. Although acetone may have limited use in some categories, as shown in Appendix D, 'typical' complying and noncomplying formulas developed for our economic impacts analysis did not include acetone. This indicates that reformulations not containing acetone are more likely. In categories where acetone could be used, the aerosol product form is already considered flammable due to the hydrocarbon propellant. Use of acetone in these products would not appreciably change how a consumer would use the product; consumers are already aware of the flammability hazard inherent in the use of aerosol products. In nonaerosol

products, we expect the reformulated products to contain water as the primary ingredient with small amounts of VOC solvents. If acetone were to be used in either nonaerosol or aerosol products, because only a relatively small amount of product is required to perform a specific task, the fire hazard is low.

Other Reformulation Options

Staff has identified that certain toxic compounds, GHGs, or surfactants could be used in reformulated products. Where necessary, staff is proposing mitigation measures to ensure that use of the toxic air contaminants methylene chloride, perchloroethylene, and trichloroethylene does not increase as products are reformulated. A specific mitigation measure is also proposed to ensure that use of GHG with GWP values at or above 150 does not begin. Another proposed mitigation measure would preclude use of the alkylphenol ethoxylate surfactants due to aquatic toxicity impacts. More information on each of these proposals is contained in Chapters VI, VII, and IX.

Options Other than Direct Compliance with the Proposed VOC Limits

Manufacturers can also comply with the proposed amendments through the use of the Innovative Products Provision (IPP), or the Alternative Control Plan (ACP). The IPP allows manufacturers of “innovative products” to comply with the Consumer Products Regulation if they demonstrate through clear and convincing evidence that their product will result in less VOC emissions than a complying product that meets the applicable VOC limit. The innovative product may result in less emissions due to some characteristic of the product formulation, design, delivery system, or other factors.

The ACP allows a manufacturer to average the emissions from products above and below the applicable VOC limits, as long as the overall emissions are less than or equal to the emissions that would have occurred had all the products complied with the VOC limits. The manufacturer must submit an application which includes the VOC content of the products in the plan, a method of verifying the sales of each product in the plan, and other information necessary to track overall emissions.

D. Necessity of Proposed Amendments

Because significant further VOC emissions reductions are necessary to attain the national and State ozone standards, the reductions from the amendments proposed in this report are therefore “necessary” within the meaning of section 41712 of the Health and Safety Code. In addition, section 41712(b)(1) of the Health and Safety Code provides that the “necessity” of a regulation is to be evaluated in terms of both the State and federal standards.

The applicable State and federal laws show that both the U.S. Congress and the California Legislature intended progress toward clean air be made as quickly as possible. The CCAA specifically declares that it is the intent of the Legislature that the State air quality standards be achieved “...by the earliest practicable date...” (See Health

and Safety Code, sections 40910 and 40913(a); see also the uncodified section 1(b)(2) of the Act (Stats. 1988, Chapter 1568)). A similar intent is expressed in the federal Clean Air Act, which declares that the federal air quality standards are to be achieved “...as expeditiously as practicable...” (See sections 172(a)(2), 181(a), and 188(c) of the federal Clean Air Act). For all of the reasons described above, the proposed amendments are “necessary” within the meaning of section 41712 of the Health and Safety Code.

The amendments proposed in this rulemaking are the third increment toward fulfilling the 2007 SIP element for VOC reductions from consumer products.

E. Alternatives Considered

Government Code section 11346.2 requires ARB to consider and evaluate reasonable alternatives to the proposed regulation and provide reasons for rejecting those alternatives. We identified three alternative approaches to the current proposal: “No action,” “set different limits,” and “set reactivity-based VOC limits.” Our rationale for rejecting these alternatives, in favor of the proposal chosen, follows.

Alternative One – No Action

A “no action” alternative would be to forego adopting the proposed amendments, or delay adoption of the proposed measures. The “no action” alternative would result in failing to make progress toward meeting our SIP commitment (see Chapter III). If the SIP commitments are not met, there is a potential that the State could lose federal funds. In addition, the citizens of California would not benefit from the improved air quality that would result from the reduction of emissions being proposed. This alternative would have no cost to business.

Alternative Two – Set Different Limits

Staff thoroughly evaluated each category for which a limit is proposed. Limits were proposed based on low emitting technologies reported in the 2006 Survey and 2008 Survey Update. Stakeholders provided additional information pertinent to the categories and, in some cases, proposed alternative limits. We evaluated all comments and determined the most feasible limit and effective dates from all of the alternatives proposed or considered. The final proposal contains limits that were determined to obtain the maximum feasible reduction, were commercially and technologically feasible, preserved product forms, maintained efficacy of health benefit products, and together achieved the necessary emission reductions to partially fulfill ARB’s SIP commitments.

Alternative Three – Set Reactivity-based Limits

For each category staff determined the maximum feasible VOC reduction that could be achieved through proposing mass-based VOC limits. Staff then compared this

reduction to the reduction that could be achieved by proposing reactivity-based VOC limits. Staff found that mass-based limits provided the better air quality benefit. In some categories a small number of VOC ingredients are used making VOC substitution unfeasible. VOC substitution is the premise for reactivity-based VOC limits. In other categories, use of water and surfactant technology appears to be the most viable reformulation option. Use of this technology is negligibly reactive so again, there is little opportunity for substitution. Finally, in other categories the mass-based limits proposed resulted in greater air quality benefits. For all of these reasons we rejected the alternative to set reactivity-based limits.

REFERENCES

1. Air Resources Board. 2008 Consumer & Commercial Products Survey Update for Dry Clean Only Spot Removers. January 14, 2009. (ARB, 2009e)
2. Air Resources Board. Statewide Human Population Chart: Population and Vehicle Trends Report. April 2008. (ARB, 2008c)
3. Air Resources Board. 2006 Consumer & Commercial Products Survey (Including Aerosol Coating Products). July 24, 2007. (ARB, 2007e)
4. Office of Environmental Health Hazard Assessment. Provisional Reference Exposure Levels (RELS) Compounds of Interest As Possible LVP-VOCS. Memorandum dated September 16, 2010, from Melanie Marty, Ph.D., Chief, Air Toxicology and Epidemiology Branch, Office of Environmental Health Hazard Assessment, to Janette Brooks, Chief, Air Quality Measures Branch, Air Resources Board. (OEHHA, 2010)

Chapter VI. Plain Language Description of the Proposed Amendments to the Consumer Products Regulation

In this chapter, we provide a plain language description of the proposed amendments to the California Regulation for Reducing Emissions from Consumer Products (Consumer Products Regulation) and explain the rationale and necessity for the proposals. The regulation is codified in title 17, California Code of Regulations, Division 3, Chapter 1, Subchapter 8.5, Article 2, Consumer Products, sections 94507-94515. A description of the proposed changes to test method “Determination of Volatile Organic Compounds (VOC) in Consumer Products and Reactive Organic Compounds in Aerosol Coating Products” (Method 310) is also included.

The information in this chapter satisfies the requirements of Government Code section 11343.2, which requires that a noncontrolling “plain English” summary of the regulation be made available to the public. Where applicable, key terms or concepts involved in each proposed amendment are described. The proposed amendments to the Consumer Products Regulation and Method 310 can be found in Appendices A and B, respectively.

Amendments are being proposed to the following sections in the Consumer Products Regulation: section 94508 “Definitions;” section 94509 “Standards for Consumer Products;” section 94510 “Exemptions;” section 94512 “Administrative Requirements,” and section 94515 “Test Methods.”

A more detailed discussion of the existing regulatory requirements can be found in additional ARB publications which are referenced at the end of this chapter (ARB, 2009c; ARB, 2008a; ARB, 2006a; ARB, 2004b; ARB, 1999; ARB, 1997b; ARB, 1991; ARB, 1990).

Changes to Method 310 would modify section 2 to include additional applicable test methods to analyze consumer products for compliance. Proposed new subsection 3.3.8 would specify the procedures for analyzing for aromatic compound content in “Paint Thinner” and “Multi-purpose Solvent” products. New subsection 4.2.3 is proposed to specify the procedures for analyzing for the VOC content of “Fabric Softener-Single Use Dryer Product.”

In Chapter III we summarized the legal requirements that must be adhered to in the regulation of consumer products. In the sections below, we describe the proposed amendments and the rationale for them.

A. Proposed Amendments to Section 94508(a): Definitions

Section 94508, “Definitions,” provides all the terms used in the Consumer Products Regulation which are not self-explanatory. The proposed amendments to the regulation include 3 new and 16 revised definitions. Table VI-1 lists the proposed new or modified definitions. These changes are necessary to improve clarity, improve enforceability, or to describe the types of products that are included or excluded from the product categories. Because of the proposed definitional changes, section 94508(a) would also be reorganized to reflect proper alphabetical order. Chapter VII, contains a detailed description of the products in each category for which a VOC limit is proposed, along with the proposed limits.

**Table VI-1
Proposed New and Modified Definitions**

Alkylphenol Ethoxylate *	Lubricant
Artist’s Thinner/Solvent	Metal Polish/Cleanser
Automotive Wax/Polish/Sealant/Glaze	Multi-purpose Solvent
Dry Cleaning Fluid	Oven or Grill Cleaner
Existing Product	Sealant or Caulking Compound
General Purpose Cleaner	Silicone-based Multi-purpose Lubricant
General Purpose Degreaser	Special-purpose Lubricant *
Gum or Candle Wax Remover *	Spot Remover
Lawn and Garden Insecticide	Wasp and Hornet Insecticide
Laundry Prewash	

* New Definition

Many of the proposed changes to definitions are minor clarifications. However, several of these proposed definitions warrant further discussion.

Alkylphenol Ethoxylate

We are proposing to add a definition for Alkylphenol Ethoxylate. An alkylphenol ethoxylate would be defined as a nonionic surface active agent (surfactant) composed of an alkyl chain of at least eight carbon atoms and a polyethoxylate chain attached to a benzene ring. Alkylphenol ethoxylate would include, but not be limited to, octylphenol ethoxylate (an alkyl chain consisting of eight carbon atoms), and nonylphenol ethoxylate (an alkyl chain consisting of nine carbon atoms). The definition is needed to implement our proposal to preclude use of these compounds in several categories. This is explained further in section B of this chapter.

Artist's Solvent/Thinner

At present, products meeting the definition of Artist's Solvent/Thinner are limited to specific products sold in packages of 32 fluid ounces. We are proposing to modify the definition of Artist's Solvent/Thinner to specify that an Artist's Solvent/Thinner is a product packaged in a container of 34 ounces or less. This change is being proposed because staff has determined that Artist's Solvents/Thinners are commonly packaged in metric units (*i.e.* a liter which is 33.8 ounces), rather than English units (*i.e.* a quart which is 32 ounces). Products sold in containers of this size (and meeting other criteria) are not subject to the VOC limits for Paint Thinner products. The proposed change would have negligible impacts on emissions because over the course of time, the same amount of thinner would be used.

Automotive Wax, Polish, Sealant or Glaze

The Automotive Wax, Polish, Sealant or Glaze definition has been reorganized to clarify the various subcategories that meet the definition.

General Purpose Degreaser and Lubricant

We are proposing to clarify the exemption for General Purpose Degreaser and Lubricant products used at manufacturing facilities. At present these definitions exclude products that are sold exclusively to facilities that manufacture or construct goods or commodities, and that are labeled "not for retail sale." We have determined that the phrase "not for retail sale" is inadequate to describe products used in the manufacturing process and that use of this term could allow for unintended products to meet this exemption criterion. We have also determined that in the normal chain of commerce, responsible parties for General Purpose Degreaser and Lubricant products sell products to distributors, who in turn, sell to manufacturing facilities. With this understanding, we are proposing to amend the exclusion to include distributors that sell directly to manufacturing facilities. To ensure that only products used in the manufacturing process itself meet the exclusion, we are proposing that these products be labeled "For Manufacturing Use Only." The phrase "not for retail sale," for the purposes of this regulation, would be deleted. As proposed, these provisions would become effective at the end of 2012.

Multi-purpose Solvent

Modification to the Multi-purpose Solvent definition is proposed to clarify that products that are labeled exclusively to clean a specific contaminant on a single substrate are not included in the Multi-purpose Solvent category.

Oven or Grill Cleaner

The Oven Cleaner definition is proposed for modification to include grill cleaning products. We are also proposing to clarify that to be considered an Oven or Grill

Cleaner, products must be labeled only for removing baked on cooking greases from food preparation and/or food cooking surfaces. The proposed modifications would also clarify the differences among “Oven or Grill Cleaner,” “General Purpose Cleaner” and “General Purpose Degreaser” products.

Special-purpose Lubricant

Based on staff’s evaluation and results of the survey data we are also proposing to combine several special or single purpose lubricant products (nonsilicone-based) into a single category of Special-purpose Lubricant. The proposed new category would include cutting oils; tapping oils; anti-seize products; gear, chain, and wire lubricants; and rust preventative or rust control products that make lubricating claims. Food grade lubricants with these end functions would also be considered Special-purpose Lubricants. “Special-purpose Lubricant” would not include the other regulated categories “Multi-purpose Lubricant,” “Silicone-based Multi-purpose Lubricant,” “Penetrant,” products designed and labeled exclusively to release manufactured products from molds, and products designed or labeled to provide lubricity solely by depositing a thin film of graphite, molybdenum disulfide (“moly”) or polytetrafluoroethylene or closely related fluoropolymer (“teflon”) on surfaces.

Spot Remover

At present, spotting agents used at commercial laundry and dry cleaning operations are excluded from the definition of Spot Remover. Comments were received that these products were formulated with toxic compounds and that the need for continuing to exclude these products should be evaluated. In response, staff surveyed these products and determined that these spotting agents should be regulated along with the currently regulated Spot Remover products. Therefore, we are proposing to modify the definition of “Spot Remover” to include Spot Removers used at commercial dry cleaning and laundry operations.

To implement this proposal minor clarifications to the definitions for “Laundry Prewash” and “Dry Cleaning Fluid” are also proposed. As proposed, the definition of “Laundry Prewash” would be clarified to mean the product is used in a wet cleaning process. The modification to the “Dry Cleaning Fluid” definition would clarify that a dry cleaning fluid is a product used in only dry cleaning machines or by businesses that clean fabrics such as draperies at the customer’s residence.

B. Proposed Amendments to Section 94509: Standards for Consumer Products

We are proposing to amend the Table of Standards contained in section 94509(a) as well as several other requirements in section 94509. These proposals are described below.

1. Proposed Amendments to Section 94509(a) - Table of Standards

The proposed regulatory action would amend the existing Consumer Products Regulation by specifying new or lower VOC limits for the product categories shown in Table VI-2. Together, VOC limits are proposed for 11 categories with 15 VOC limits. Special Purpose Lubricants are not currently regulated, while all of the other categories are currently subject to VOC limits. However, in the case of “Spot Remover” and “Oven or Grill Cleaner,” additional products are proposed for inclusion. For all but one of the currently regulated categories we are proposing lower VOC limits. We are proposing to slightly increase the current limit for nonaerosol “Oven or Grill Cleaner.” This proposal is explained further below.

Table VI-2 also displays the proposed effective date for each proposed limit. As specified by the regulation, the effective date for products requiring Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) registration would be one year after the effective date shown here to allow for the registration process. Where appropriate, we are proposing separate limits for aerosol products to ensure feasibility. All of these proposed limits would be reflected in the Table of Standards in section 94509(a).

Although not shown in Table VI-2, we are also proposing to delete the phrase “Non-FDA regulated” from the category “Astringent/Toner.” This phrase is not necessary because the category definition clearly specifies the types of products that are regulated as “Astringent/Toner” products. Other minor amendments to the Table of Standards are proposed to provide consistency or delete redundant language.

The emission reductions from categories with limits becoming effective by January 1, 2014, would be creditable toward the current State Implementation Plan (SIP) commitment, and would result in VOC emission reductions of about 6.7 tons per day. Products in the categories that require FIFRA registration are provided an additional year beyond the effective date shown in Table VI-2. Because of this, the reductions from Flying Bug Insecticide and Wasp or Hornet Insecticide would be credited toward a future SIP commitment. Reductions from these two categories total about 0.2 tons per day.

Several of the proposed VOC limits for the categories listed in Table VI-2 warrant additional explanation.

Proposal for “Oven or Grill Cleaner”

We are proposing to incorporate grill cleaning products into the Oven Cleaner Category. To allow the previously unregulated grill cleaner products the necessary time to reformulate, proposed subsection 94509(q) would specify that the VOC limits do not apply to these products until December 31, 2012.

Table VI-2
Proposed VOC Limits by Product Form and Effective Dates

Product Category	Product Form	Proposed VOC Limit (weight percent)	Effective Date
Flying Bug Insecticide	Aerosol	20	12/31/2013*
Furniture Maintenance Product	Aerosol	12	12/31/2013
General Purpose Cleaner	Nonaerosol	0.5	12/31/2012*
General Purpose Degreaser	Nonaerosol	0.5	12/31/2012
Glass Cleaner	Nonaerosol	3	12/31/2012
Heavy-duty Hand Cleaner or Soap	Nonaerosol	1	12/31/2013
Metal Polish or Cleanser	Aerosol	15	12/31/2012
Metal Polish or Cleanser	Nonaerosol	3	12/31/2012
Oven or Grill Cleaner	Aerosol	8	12/31/2012**
Oven or Grill Cleaner	Nonaerosol	4	[Effective Date]**
Special-purpose Lubricant	Aerosol	25	12/31/2012
Special-purpose Lubricant	Nonaerosol	3	12/31/2012
Spot Remover (Dry Clean Only)	Aerosol	15	12/31/2012
Spot Remover (Dry Clean Only)	Nonaerosol	3	12/31/2012
Wasp or Hornet Insecticide	Aerosol	10	12/31/2013*

* Products subject to FIFRA registration given an extra year to complete the registration process.

** Only products being proposed for addition to the category have until 12/31/2012 to comply (see new proposed subsection 94509(q)).

Nonaerosol Oven Cleaner products are currently subject to a VOC limit of 1 percent by weight. When this limit was adopted reported products relied on low or non-VOC caustic technologies. We have since learned of technologies that provide alternatives to caustic products. To accommodate the use of these technologies we are proposing to increase the current VOC limit to 4 percent by weight for nonaerosol Oven or Grill Cleaner products. To expedite allowing use of alternatives, as proposed, the limit revision would become effective when the amendments become legally effective. This proposal results in a small shortfall of about 0.1 tons per day. However, other reductions from this proposal would offset this change. We believe allowing for these less harsh alternatives outweighs the small VOC increase that would result.

Proposal for “Spot Remover”

We are proposing to incorporate spotters used for dry clean only fabrics into the currently regulated “Spot Remover” category. These are primarily those products used at dry cleaning operations. To accommodate the necessary time for these products to reformulate, we are also proposing to delay the effective date of the VOC limit for “Spot

Remover” products from December 31, 2010, to December 31, 2012. This modification is proposed to allow adequate time for reformulation of the new products being included in the category. The proposal to extend the effective date is intended to simplify enforcement activities related to this category; it would be difficult to discern the difference between the newly added products and those currently regulated. The proposal would result in delaying about a 0.25 tons per day VOC reduction for two years. Even with this proposed delay, the reductions would occur within the timeframe necessary to be creditable to the 2007 SIP. The newly added products would also be subject to the existing prohibition on the use of methylene chloride, perchloroethylene, and trichloroethylene for Spot Remover products effective December 31, 2012.

2. Proposed Modifications to Subsections 94509 (i)(3), (m), (n), (o), (p), (q), (r), (t), and (u)

Requirements Limiting the Use of Specific Toxic Compounds in Specific Consumer Products Categories

Currently, subsections 94509 (i)(3), (m), (n), (p), (q), and (u) specify provisions prohibiting use of the chlorinated toxic air contaminants methylene chloride, perchloroethylene, and trichloroethylene in specified categories. Subsection 94509(r) specifies prohibitions on the use of methylene chloride and perchloroethylene in Pressurized Gas Duster products. A prohibition on the use of para-dichlorobenzene in Solid Air Fresheners and Toilet/Urinal Care products is specified in subsection 94509(o). Each of these subsections also has provisions that specify sell-through dates and exemptions for impurities (except no exemption for impurities is provided for para-dichlorobenzene). The provisions are all similar except for effective and sell-through dates. We are proposing to consolidate these provisions into tables in proposed modified subsection 94509(m). The modifications are proposed to simplify the regulation by making it easier to find the prohibitions on toxic compounds.

As proposed, subsection 94509(m)(1) would contain a new table, Table 94509(m)(1), that would list categories, effective dates, and sell-through dates for all categories where use of methylene chloride, perchloroethylene, and trichloroethylene is prohibited. A reference within the table is proposed to clarify that there are additional requirements for products defined as Brake Cleaner, Carburetor or Fuel Injection Air Intake Cleaner, Engine Degreaser, and General Purpose Degreaser - intended for use in automotive products. These products are also subject to the Airborne Toxic Control Measure for Emissions of Chlorinated Toxic Air Contaminants from Automotive Maintenance and Repair Activities, section 93111, title 17, California Code of Regulations.

New Table 94509(m)(1) also contains proposed prohibitions on use of methylene chloride, perchloroethylene, and trichloroethylene in “Metal Polish or Cleanser,” “Silicone-based Multi-purpose Lubricant,” and “Special-purpose Lubricant.” These prohibitions are proposed to ensure that use of these toxic air contaminants does not occur as products are reformulated to meet the proposed VOC limits. These prohibitions are proposed as a mitigation measure under the California Environmental

Quality Act (CEQA). The rationale for the prohibition is further explained in Chapter IX, Environmental Impacts, section E. The new table would also reflect that the effective date for “Spot Remover” products would be extended to December 31, 2012, to harmonize with the proposed modification of the effective date of the VOC limit. Although additional products are being added into the “Oven or Grill Cleaner” category, we are not proposing to extend the date the prohibition on use of methylene chloride, perchloroethylene, and trichloroethylene becomes effective. This is feasible because the products being added into the category do not currently use these compounds.

Proposed subsection 94509(m)(2) would contain a new table, Table 94509(m)(2), that would list the categories effective dates, and sell-through dates for all categories where use of para-dichlorobenzene is prohibited.

Requirements Limiting the Use of Alkylphenol Ethoxylate Surfactants in Specific Consumer Product Categories

Staff is also proposing to prohibit the use of alkylphenol ethoxylate surfactants in several categories as a CEQA mitigation measure. Alkylphenol ethoxylates are nonionic surface active agents (surfactants) used as wetting agents, emulsifiers, and dispersants in cleaning and degreasing products. One reformulation pathway to meet proposed VOC limits would be to replace VOC solvents with surfactants. Alkylphenol ethoxylates meet the definition of LVP-VOC so their use is not currently restricted by the VOC limits in the Consumer Products Regulation. In the cleaning/degreasing categories, because of how the products are used, some product is washed ‘down the drain.’ Once into wastewater, alkylphenol ethoxylates do not readily degrade and they and/or their degradation products enter aquatic environments through wastewater treatment facilities or storm water.

Ample scientific evidence implicates the alkylphenol ethoxylates as toxic to aquatic species. Among other things, they are suspected hormone disruptors, with the primary concern focused on the estrogenic effects of their degradation products (David *et. al*, 2009). Nonylphenol and octylphenol ethoxylates have been shown to mimic the hormone estrogen. In light of this, ARB staff consulted with staff of the State Water Resources Control Board (SWRCB) to determine if use or increased use of alkylphenol ethoxylates would pose an adverse impact on California’s receiving waters.

Information provided to the SWRCB staff indicates that alkylphenol ethoxylates are found in measurable concentrations in the State’s receiving waters. Moreover, SWRCB staff is concerned that any potential increased use of alkylphenol ethoxylates could adversely impact aquatic species (SWRCB, 2010a; SWRCB, 2010b; SCCWRP, 2010; and SFEI, 2010). As proposed, after December 31, 2012, use of alkylphenol ethoxylate surfactants would be prohibited from use in Oven or Grill Cleaner products and in the nonaerosol forms of General Purpose Cleaner, General Purpose Degreaser, and Glass Cleaner. A proposed prohibition on use in nonaerosol Heavy-duty Hand Cleaner or Soap products would become effective December 31, 2013. These prohibitions are proposed to ensure that use of these compounds does not occur as products are

reformulated to meet the proposed VOC limits. This proposal would be contained in modified subsection 94509(m)(3).

Staff also finds that replacements for alkylphenol ethoxylates are readily available. Alcohol ethoxylate, linear alkylbenzene sulphonate, and alkyl polyglucoside surfactants are considered to be effective and environmentally safer. Additional information on this proposal is contained in Chapter IX, Environmental Impacts, section E.

Additional Modifications to subsection 94509(m)

Proposed new subparts 94509(m)(4) and (m)(5) would specify the provisions related to sell-through of products manufactured before the effective dates of the prohibitions. Proposed new subpart 94509(m)(6) would specify the exemption for impurities for the categories listed in Table (m)(1).

Requirements for Specific Consumer Products Limiting the Use of Any Chemical Compound that has a Global Warming Potential (GWP) Value of 150 or Greater

At present, subsections 94509(r), (t), and (q), among other things, contain prohibitions on the use of compounds that have GWP values of 150 or greater. We are proposing to consolidate these provisions into modified subsection 94509(n). New Table 94509(n)(1) would list the categories, effective date, and sell-through date for each category where GWP limits have been adopted. Newly proposed Table 94509(n)(1) would also include additional categories for which we are proposing GWP limits in this rulemaking. We are proposing to prohibit the use of global warming compounds that have GWP values of 150 or greater in "Flying Bug Insecticide," "Furniture Maintenance Product," "Metal Polish or Cleanser," "Special-purpose Lubricant," "Spot Remover," and "Wasp or Hornet Insecticide" products. These prohibitions are proposed to ensure that use of compounds with higher GWP values does not begin as products are reformulated to meet proposed VOC limits. The measure is proposed as a CEQA mitigation measure and the rationale for the prohibition is further explained in Chapter IX, Environmental Impacts, section E.

New subparts (n)(2) and (3) would specify the provision related to sell-through. New subpart (n)(4) would specify the exemption for impurities. The modifications are proposed to simplify the regulation by making it easier to find the prohibitions on use of compounds with GWP values of 150 or greater.

Additional Modifications to Section 94509

Because of the consolidation of various provisions into new subsections 94509(m) and (n), as described above, we are proposing to delete existing subparts (i)(3), (m), (n), (o), (p), (q), (r), and (t). Subsection (s) would be re-lettered to subsection (o). Subsection (u) would be re-lettered to subsection (p) and be modified to pertain only to provisions related to limiting the aromatic compound content of Paint Thinner and Multi-purpose

Solvent products. The references within the Table of Standards in section 94509(a) to the various toxic compound prohibitions and the GWP limits would also be modified to reference new subsections (m) and (n), as well as the re-lettered subsections (o) and (p).

Proposed new subsection 94509(q) would specify the compliance date for new products added to the “Oven or Grill Cleaner” category. As proposed, the effective date for the newly added products would be December 31, 2012. This should allow adequate time for the noncomplying products to reformulate.

C. Proposed Amendments to Sections 94510: Exemptions and Section 94515: Test Methods

Minor amendments are proposed to sections 94510 and 94515. The amendments to subsection (c) would delete unnecessary language. Amendment to subsection (g) is proposed to reference new subsection (m)(2) relating to prohibitions on use of para-dichlorobenzene.

Minor modifications are proposed to subsections 94515 (c) and (d) to reflect the reorganization of subsection 94509 (m) and (n). Sections (c) and (d) specify procedures related to determining the aromatic compound content of Paint Thinner and Multi-purpose Solvent products.

D. Proposed Amendments to Section 94512: Administrative Requirements

We are proposing to amend the Most Restrictive Limit provision contained in subsection 94512(a). Subpart (3) would be modified to clarify the regulation’s applicability when two defined categories exclude each other within their respective definitions. As proposed, when a definition for a specific category excludes another specific category and *vice versa*, the product is subject to the VOC limit for whichever category is lower.

E. Proposed Amendments to Method 310

ARB Test Method 310 sets forth the analytical procedures and processes to determine the VOC content of consumer products. We are proposing to amend this method to incorporate additional testing procedures and standard test methods to analyze consumer products for compliance. These modifications are proposed to specify the procedures to be used to analyze for the aromatic compound content in “Paint Thinner” and “Multi-purpose Solvent” products and the VOC content of “Fabric Softener-Single Use Dryer Product.”

Proposed amendments to section 2 of Method 310 would include additional applicable test methods to analyze consumer products for compliance. The added methods would

pertain to analysis of aromatic compound content. The following methods are proposed for addition:

- ASTM D 3257-06: Standard Test Methods for Aromatics in Mineral Spirits by Gas Chromatography (April 1, 2006)
- ASTM D 3606-07: Standard Test Method for Determination of Benzene and Toluene in Finished Motor and Aviation Gasoline by Gas Chromatography (Nov. 1, 2007)
- ASTM D 3710-95 (Reapproved 2004): Standard Test Method for Boiling Range Distribution of Gasoline and Gasoline Fractions by Gas Chromatography (Nov. 1, 2004)
- ASTM D 5443-04: Standard Test Method for Paraffin, Naphthene, and Aromatic Hydrocarbon Type Analysis in Petroleum Distillates Through 200°C by Multi-Dimensional Gas Chromatography (Nov. 1, 2004)
- ASTM D 5580-02 (Reapproved in 2007): Standard Test Method for Determination of Benzene, Toluene, Ethylbenzene, p/m-Xylene, o-Xylene, C₉ and Heavier Aromatics, and Total Aromatics in Finished Gasoline by Gas Chromatography (Nov. 1, 2007)
- ASTM E 1782-08: Standard Test Method for Determining Vapor Pressure by Thermal Analysis (March 1, 2008)
- U.S. EPA Method 602: Purgable Aromatics, 40CFR Part 136 Appendix A, Method for Organic Chemical Analysis of Municipal and Industrial Wastewater (January 2008)
- U.S. EPA Method 625: Base/Neutrals and Acids, 40CFR Part 136 Appendix A, Method for Organic Chemical Analysis of Municipal and Industrial Wastewater (January 2008)
- U.S. EPA SW-846 Method 8015B: Nonhalogenated Organics Using GC/FID (Rev 2, December 1996)
- U.S. EPA SW-846 Method 8020A: Aromatic Volatile Organics by Gas Chromatography (Rev 1, September 1994)
- U.S. EPA SW-846 Method 8270D: Semivolatile Organic Compounds by Gas Chromatography / Mass Spectroscopy (GC/MS) (Rev. 4, January 1998)

New subsections are also being proposed. Proposed new subsection 3.3.8 would specify the procedures for analyzing for aromatic compound content in “Paint Thinner” and “Multi-purpose Solvent” products. New subsection 4.2.3 would specify the

procedures for analyzing for the VOC content of “Fabric Softener-Single Use Dryer Product.”

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13. State Water Resources Control Board. Effects on Water Quality of Alkylphenol Ethoxylate Surfactants. Memorandum dated July 19, 2010, from Valerie Connor, Ph.D., Deputy Director, Office of Information Management and Analysis, State Water Resources Control Board, to Darrin Polhemus, Deputy Director, Division of Water Quality, State Water Resources Control Board. (SWRCB, 2010b)

Chapter VII. Description of Product Categories

In this chapter, we describe each product category and provide the technical basis for the proposed requirements. We are proposing volatile organic compound (VOC) limits for 11 categories. In several categories, prohibitions on use of specific toxic air contaminants (TAC), green house gas (GHG) compounds with higher global warming potential (GWP) values, and alkylphenol ethoxylate surfactants are proposed. These three prohibitions are proposed in accordance with the California Environmental Quality Act (CEQA). If applicable, proposed modifications to definitions are provided along with the rationale for the changes.

In each section below, two tables of data are provided. Unless otherwise indicated, the data in the tables are based on the 2006 Consumer and Commercial Products Survey (2006 Survey). The data have been grown to the current calendar year, 2010, based on population increases. In addition, in each category it is assumed that the 2006 Survey contains information for about 90 percent of the products sold into California. Therefore, the data in the tables are adjusted for market coverage. The VOC emission reductions predicted are also grown to the calendar year the proposed limits would become effective, based on projected population increases. In one category, "Spot Remover" (Dry Clean Only), the data are based on the 2008 Survey Update for Dry Clean Only Spot Removers (2008 Survey Update). The surveys are described in greater detail in Chapter V.

A. Flying Bug Insecticide (aerosol)

Flying Bug Insecticide products are designed to be used primarily by consumers in the control of flying household insects or pests such as flies, mosquitoes, gnats, and moths. Flying Bug Insecticide products do not include "Wasp or Hornet Insecticide," products designed to be used on humans or animals, or any moth-proofing product.

All insecticides sold within California must be registered with the California Department of Pesticide Regulation (DPR) and with the U.S. EPA under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). These registrations are designed to thoroughly evaluate the insecticide product to ensure it meets both federal and State requirements to protect public health and the environment. As part of the registration process, the efficacy data are reviewed to validate the spectrum of activity. For products registered under FIFRA, as specified in section 94509(d), the Consumer Products Regulation allows an additional year for compliance with the VOC limit to allow the necessary time to complete the registrations.

Flying Bug Insecticide products were first regulated as part of the Phase-II amendments approved by the Board in January 1992. At that time, the Board approved a 35 percent by weight VOC limit for all forms, effective January 1, 1995. In 1999, the VOC limit for aerosol Flying Bug Insecticide products was lowered to 25 percent by weight, effective December 31, 2003. Additional information on product use and marketing can be found in the 1991 Phase-II and the 1999 Midterm Measures II "staff reports" (ARB, 1991; ARB 1999).

The 2006 Survey data provide the basis for our determination that it is both technologically and commercially feasible to further reduce the VOC content of Flying Bug Insecticide products. Based on these data, staff is proposing to lower the VOC limit for aerosol products to 20 percent by weight.

Table VII-1 below summarizes the sales and emissions from aerosol Flying Bug Insecticide products based on the results of the 2006 Survey (ARB, 2007e). The data for the 51 reported products have been grown, by population, to 2010. Total category sales from these products are about 5,858 pounds per day.

**Table VII-1
Flying Bug Insecticide**

Product Form	Number of Products	2010 Category Sales (pounds per day)	2010 Market-Adjusted VOC Emissions (pounds per day)
Aerosol	51	5,858	1,306

Also shown in Table VII-1, estimated 2010 market-adjusted VOC emissions for aerosol Flying Bug Insecticide products are 1,306 pounds per day, or about 0.7 tons per day in California. Although not shown, the sales-weighted average VOC content is about 22 percent by weight.

Product Use and Marketing:

Flying Bug Insecticide products are used primarily by household consumers and janitors. These products may be used either indoors or outdoors and in multiple settings including households, businesses, and institutions. Flying Bug Insecticide products also include some foggers designed to release contents, as a fog or mist, in outdoor areas to control flying insects.

Flying Bug Insecticide products are typically sold in supermarkets; general mass market stores; discount stores; home improvement stores; and nurseries.

Product Formulation:

Flying Bug Insecticide products contain both "active" and "inert" ingredients. The terms "active ingredient" and "inert ingredient" have been defined by the U.S. EPA. An active

ingredient prevents, destroys, repels or mitigates a pest, or is a plant regulator, defoliant, desiccant or nitrogen stabilizer. By law, the name and percent by weight of the active ingredient must be identified and displayed on the product label.

An inert ingredient is defined by U.S. EPA as any substance (or group of structurally similar substances if designated by U.S. EPA), other than an active ingredient, which is intentionally included in a pesticide product. Inert ingredients may play a key role in the effectiveness of a pesticide product. For example, inert ingredients may serve as a solvent, or may extend the pesticide product's shelf-life. Pesticide products can contain many inert ingredients, but federal law does not require that these ingredients be identified by name or percentage on the label. Only the total percentage of inert ingredients is required to be on the pesticide product label (U.S. EPA, 2003b; U.S. EPA, 2010a).

In this rulemaking, our proposal does not directly affect the active ingredients to be used. The proposal affects the inert ingredients that are VOCs and compounds with higher GWP values.

The VOC content of aerosol Flying Bug Insecticide products ranges from 0 to 25 percent by weight. Flying Bug Insecticide products typically contain about 1 percent pyrethrins and/or pyrethroids as the active ingredient (ARB, 2007e). Pyrethrins are derived from Chrysanthemum flowers and pyrethroids are synthetic derivatives of pyrethrins. Some commonly used pyrethroids in Flying Bug Insecticide products include permethrin, tetramethrin, allethrin, and resmethrin. These active ingredients perform the key function of the insecticide which is to either kill or inhibit the targeted pest. Most active ingredients qualify as low vapor pressure (LVP) VOCs, therefore the proposed VOC limit would not apply to these compounds.

Based on data received from the 2006 Survey, most products in this category are water-based and use a hydrocarbon propellant to evacuate the contents. Hydrocarbon propellants are the primary source of VOCs in these products and the propellants comprise up to about 25 percent by weight of the product. A small amount of LVP-VOC surfactant is often added to emulsify the active ingredients with water. Together, these are the inert ingredients.

Proposed VOC Limit and Compliance:

The proposed VOC limit for aerosol Flying Bug Insecticide products is 20 percent by weight, effective December 31, 2013. As shown in Table VII-2, using adjusted emissions, the proposed 20 percent limit will result in an estimated VOC emission reduction of 115 pounds per day, or about 0.06 tons per day, in 2014. The emission reduction is estimated for 2014 because to complete the registration process required by FIFRA and the DPR the Consumer Products Regulation allows an extra year to complete this process. This reduction, although important to overall air quality, will not occur within the timeframe to be credited toward the current SIP commitment.

**Table VII-2
Flying Bug Insecticide Proposal**

Product Form	Proposed VOC Limit (weight percent)	Number of Complying Products	Complying Market Share (percent)	2014 Emissions Reductions (pounds per day)
Aerosol	20	18	55	115

As shown in Table VII-2, 18 products, representing approximately 55 percent of the market, currently comply with the proposed VOC limit of 20 percent by weight. Thus, staff has determined that reformulation to the proposed limit is both technologically and commercially feasible.

In determining the most feasible limit staff reviewed data indicating that aerosol Flying Bug Insecticides require about 20 percent VOC propellant. This amount is necessary to achieve the appropriate particle size to remain suspended in the air for an adequate amount of time to directly contact the flying insect. Effective particle size is approximately 30-50 micrometers in diameter (AgrEvo, 2010). The data also indicated that as the level of propellant decreases, particle size increases (MGK, 2010). When the amount of propellant was reduced to less than 20 percent particles greater than 60 micrometers in diameter were dispersed. These are too large to maintain product efficacy. Further, these data demonstrate the continued validity of a statement staff made in the "Midterm Measures II" staff report: "Particle size is a key difference between crawling and flying bug killers, and is generally related to the amount of propellant in the formulation" (ARB, 1999). Flying Bug Insecticide product manufacturers also identified 20 percent VOC as the lowest possible limit that would maintain product efficacy (CSPA, 2010a).

Reformulation options that can be used by manufacturers to meet the proposed limit include reducing the level of hydrocarbon propellant and increasing the amount of water, and/or LVP-VOC distillate. We expect that manufacturers will meet the proposed limit by using formulation technologies similar to those already used in complying products.

Proposed Global Warming Potential (GWP) Limit:

No compounds with GWP values at or above 150 were reported in the 2006 Survey for this category. However, to ensure that use of compounds with higher GWP values does not begin as products reformulate to comply with the proposed 20 percent by weight VOC limit, we are proposing a GWP limit of 150 for any chemical compound used in Flying Bug Insecticide products, effective December 31, 2013. While this proposal would allow use of the non-VOC propellant, HFC-152a, we believe other reformulation options are more likely. The proposed limit would not apply to any chemicals present as contaminants, which in aggregate are 0.1 percent by weight or less. This limit is proposed as a mitigation measure under CEQA (see Chapter IX, Environmental Impacts, section E). The proposed GWP limit is contained in section 94509(n).

B. Furniture Maintenance Product (aerosol)

“Furniture Maintenance Product” is defined as a product designed or labeled to wax, polish, protect, or enhance a previously finished wood surface by leaving a protective finish that is designed to be periodically replenished. Products designed for use on wood floors are not included. These products may also be used on other furniture surfaces, such as acrylics, ceramic, plastics, stone, metal, and fiberglass. This category does not include “Dusting Aid,” “Wood Cleaner,” and products designed solely for the purpose of cleaning. Products designed to leave a permanent finish such as stains, sanding sealers, and lacquers are also excluded. Products that are designed with the sole purpose of removing dust without leaving a protective finish are regulated as “Dusting Aid.” While the “Furniture Maintenance Product” category includes products that claim to clean and polish wood surfaces, products that are designed solely to clean a wood surface are regulated as “Wood Cleaners.”

Aerosol Furniture Maintenance Products are currently subject to a 17 percent by weight VOC limit, which has been in effect since December 31, 2004.

The 2006 Survey data provides the basis for our determination that it is both technologically and commercially feasible to further reduce the VOC content of these products. Based on these data, staff is proposing to lower the VOC limit for aerosol Furniture Maintenance Products to 12 percent by weight.

Table VII-3 below summarizes the sales and emissions from aerosol Furniture Maintenance Products based on the results of the 2006 Survey (ARB, 2007e). The data for the 87 reported products have been grown, by population, to 2010. Total category sales from these products are about 16,792 pounds per day.

Table VII-3
Furniture Maintenance Product

Product Form	Number of Products	2010 Category Sales (pounds per day)	2010 Market-Adjusted VOC Emissions (pounds per day)
Aerosol	87	16,792	2,640

Also shown in Table VII-3, estimated 2010 market-adjusted VOC emissions for aerosol Furniture Maintenance Products are 2,640 pounds per day, or about 1.3 tons per day in California. Although not shown, the sales-weighted average VOC content is about 15.7 percent by weight.

Product Use and Marketing:

Aerosol Furniture Maintenance Products are used by household, institutional, and industrial users. Many of these products are designed for use on a variety of wood surfaces. In addition, there are a number of aerosol Furniture Maintenance Products

that are designed for use on other furniture surfaces such as ceramic, plastic, stone, metal, and fiberglass. Aerosol Furniture Maintenance Products are designed to be sprayed either directly on a furniture surface and wiped with a clean cloth, or sprayed directly onto a clean cloth which is then used to wipe a surface. Aerosol Furniture Maintenance Products that contain silicone oils are often labeled with the claim “increases shine without leaving a waxy residue.”

Aerosol Furniture Maintenance Products are primarily sold to the household consumer through retail outlets such as supermarkets, grocery stores, and warehouse stores. Products sold to institutional and industrial users are supplied through a variety of locations, including direct sales, catalog sales, janitorial stores, and the Internet.

Product Formulation:

Aerosol Furniture Maintenance Products are emulsions that typically contain water; a VOC hydrocarbon solvent; a VOC hydrocarbon propellant; and a polishing component such as silicone oil, mineral oil, or wax. The VOC hydrocarbon solvent constitutes up to about 7 percent of the product. The solvent functions to suspend the wax or oil and assists to remove smudges and fingerprint oils. The main polishing compounds reported are the exempt VOC volatile methylated siloxanes (VMS). VMS content of aerosol Furniture Maintenance Products ranges from 2 to 8 percent by weight. Another common polishing component found in these products is an LVP-VOC mineral oil. The hydrocarbon propellant which serves to expel the product ranges from about 4 to 12 percent by weight. These products may also contain a small amount of fragrance, such as citrus oils (ARB, 2007e).

Proposed VOC limit and Compliance:

The proposed VOC limit for aerosol Furniture Maintenance Products is 12 percent by weight, effective December 31, 2013. As shown in Table VII-4, using adjusted 2006 emissions, the proposed VOC limit will result in an estimated emission reduction of 724 pounds per day, or about 0.36 tons per day by 2013.

**Table VII-4
Furniture Maintenance Product Proposal**

Product Form	Proposed VOC Limit (weight percent)	Number of Complying Products	Complying Market Share (percent)	2013 Emissions Reductions (pounds per day)
Aerosol	12	37	9.8	724

As shown in Table VII-4, 37 of 87 reported products representing about 10 percent of product sales currently comply with the proposed 12 percent VOC limit. Therefore, staff has determined that the proposed VOC limit is technologically and commercially feasible.

Complying products reported in the 2006 Survey contain an LVP-VOC solvent, a smaller percentage of hydrocarbon propellant, and mineral oil or VMS as the polishing agents. Reformulation options that can be used to meet the proposed limit include replacing all or part of the VOC hydrocarbon solvent by increasing use of LVP-VOC hydrocarbon solvent. Reducing the amount of hydrocarbon propellant also appears to be feasible, based on the 2006 Survey (ARB, 2007e).

GWP Limit:

No compounds with GWP values at or above 150 were reported in the 2006 Survey for this category. However, to ensure that use of compounds with higher GWP values does not begin as products reformulate to comply with the proposed 12 percent by weight VOC limit, we are proposing a GWP limit of 150 for any chemical compound used in Furniture Maintenance Products, effective December 31, 2013. While this proposal would allow use of the non-VOC propellant, HFC-152a, we believe other reformulation options are more likely. The proposed limit would not apply to any chemicals present as contaminants, which in aggregate are 0.1 percent by weight or less. This limit is proposed as a mitigation measure under CEQA (see Chapter IX, Environmental Impacts, section E). The proposed limit is contained in section 94509(n).

Issues:

- 1 **Issue:** Lowering the VOC limit in this category would open up the possibility of Wood Cleaner products being subject to the most restrictive limit (*i.e.* a product that is primarily a Wood Cleaner but whose label claims could be construed to also belong to the Furniture Maintenance Product). Such a product would have to meet the proposed 12 percent by weight VOC limit instead of the current 17 percent by weight Wood Cleaner VOC limit.

Response: Staff agrees that if a Wood Cleaner product makes claims that it is suitable for use as a Furniture Maintenance Product, the most restrictive limit provision applies and the product would need to contain no more than 12 percent VOC by weight. Therefore, it is incumbent on the responsible party to ensure that labeling claims are consistent only with the Wood Cleaner category.

C. General Purpose Cleaner (nonaerosol)

“General Purpose Cleaner” products are currently defined as a general purpose cleaning product labeled for use on a variety of hard surfaces, including small appliances. The General Purpose Cleaner category includes, but is not limited to, products designed or labeled for general floor cleaning, kitchen, countertop, or sink cleaning, and cleaners designed or labeled to be used on a variety of hard surfaces such as stovetops, cooktops, or microwaves. Because of its many uses, General Purpose Cleaner products are not subject to the Most Restrictive Limit provision in section 94512(a). Staff is proposing minor changes to the definition of “General Purpose Cleaner” to improve clarity. The proposed modified definition reads as follows:

“General Purpose Cleaner” means a ~~general purpose cleaning~~ product labeled for use ~~on to clean~~ a variety of hard surfaces, ~~including small appliances~~. “General Purpose Cleaner” includes, but is not limited to, products designed or labeled for general floor cleaning, kitchen, countertop, or sink cleaning, and cleaners designed or labeled to be used on a variety of hard surfaces such as stovetops, cooktops, or microwaves.

Nonaerosol General Purpose Cleaner products are currently subject to a 4 percent by weight VOC limit, which has been in effect since December 31, 2004. In addition, use of the TACs methylene chloride, perchloroethylene, and trichloroethylene is prohibited. This prohibition became effective December 31, 2008.

The 2006 Survey data provides the basis for our determination that it is both technologically and commercially feasible to further reduce the VOC content of these products. Based on these data, in this rulemaking we are proposing to lower the VOC limit for nonaerosol General Purpose Cleaner products to 0.5 percent by weight.

Table VII-5 below summarizes the sales and emissions from nonaerosol General Purpose Cleaner products based on the results of the 2006 Survey (ARB, 2007e). The data for the 1,518 reported products have been grown, by population, to 2010. Total category sales from these products are about 870,854 pounds per day.

Also shown in Table VII-5, estimated 2010 market-adjusted VOC emissions for nonaerosol General Purpose Cleaner products are 24,078 pounds per day, or

**Table VII-5
General Purpose Cleaner**

Product Form	Number of Products	2010 Category Sales (pounds per day)	2010 Market-Adjusted VOC Emissions (pounds per day)
Nonaerosol	1,518	870,854	24,078

about 12 tons per day in California. Although not shown in the table, the sales-weighted average VOC content is 0.8 percent by weight.

Based on data from the 2003 Survey (ARB, 2004a), aerosol General Purpose Cleaner products were found to have sales of about 6,800 pounds per day, or about 3.4 tons per day. This suggests that nonaerosol products dominate the market in this category.

Product Use and Marketing:

General Purpose Cleaner products are used by household and institutional consumers for general cleaning and removal of soils, stains, or spots from different hard surfaces such as floors, counters, and sinks. For cleaning, products are applied either directly to

the surface or indirectly with a mop or sponge to cover large areas. Rinsing may or may not be necessary after the product is used.

Nonaerosol General Purpose Cleaner products are sold either as concentrates or ready-to-use (RTU) products and are available with many different delivery systems, including liquids, solids, pump sprays, and wipes. Industrial and Institutional consumers might also use products in automated dispensing machines. Some products are marketed under the name of a specific active ingredient in their formulations such as citrus cleaner, pine cleaner, bleach cleaner, or ammoniated cleaner. Because of their degreasing and glass cleaning abilities, some of the products are also marketed as “cleaner-degreaser,” “all-purpose cleaner,” “glass and surface cleaner,” or “multi-surface cleaner.” There are also General Purpose Cleaner products that make anti-microbial claims.

General Purpose Cleaner products are available in a variety of stores, including grocery stores, janitorial supply stores, discount stores, *etc.* They are sold to household consumers, janitors, restaurants, and other commercial or institutional establishments for general cleaning and, to a certain extent as an anti-microbial agent. For the purpose of this regulation, products primarily labeled as “General Purpose Cleaner” that make anti-microbial or disinfecting claims are considered “General Purpose Cleaner” products.

Additional information on product use and marketing can be found in the “1999 Mid-term Measures II” and “2006 CONS-2” “Initial Statement of Reasons for the Proposed Amendments to the Consumer Products Regulation” (ARB, 1999; ARB, 2006a).

Product Formulation:

Nonaerosol General Purpose Cleaner products are primarily water-based products. In liquid products VOC ingredients are isopropyl and ethyl alcohols, ethylene glycol monobutyl ether, pinene, and d-limonene. The VOC content ranges from 0 to 4 percent by weight. LVP-VOCs reported include several glycol ethers and triethanolamine. Other ingredients reported include, surfactants, and inorganic compounds. The VOC and LVP-VOC glycol ethers, terpenes, and alcohols provide solvency to remove most soils. Inorganic compounds aid in maintaining pH and solvency. Ethanolamines are weak bases that can provide stability and texture to a product. Products generally contain a small amount of fragrance. Surfactants play a key role in the cleaning process. Their role is discussed below.

Nonaerosol General Purpose Cleaner product formulations use a variety of wetting agents or surfactants. They reduce surface tension of liquids and assist in the cleaning of soils from multiple surfaces. Ionic surfactants are either anionic or cationic. Anionic surfactants are water soluble and have a negative charge in solution. They typically are ‘foaming’ or ‘sudsy’ and are good cleaners. Examples include linear alkyl benzene sulfonate, soaps or fatty acid salts, and sodium dodecyl sulfate (CQ, 2008). Cationic surfactants are positively charged in aqueous solution. They are less effective cleaners.

The primary cationic surfactants, are the quaternary ammonium compounds. These are the typical active ingredients in products making anti-microbial claims (PG, 2010).

Nonionic surfactants are low sudsing and do not have a charge. Because they do not ionize in solution they are not affected by water hardness. They are good cleaning agents. Common nonionic surfactants include alcohol ethoxylates, alkyl polysaccharides, and alkylphenol ethoxylates.

Nonaerosol General Purpose Cleaner products that make anti-microbial claims must be FIFRA and DPR registered. About 80 of the reported products are FIFRA registered products. Many anti-microbial General Purpose Cleaner products contain LVP-VOC quaternary ammonium compounds as the active ingredient. Other reported active anti-microbial ingredients include sodium hypochlorite (bleach) and l-lactic acid. These compounds did not have to be specified in the survey, but we are aware that these are the active anti-microbial agents because of FIFRA labeling requirements.

Health and Safety Code Section 41712(e)(1) directs the ARB to consider recommendations from a health agency (local, state, or federal) regarding regulation of health benefit products. This process was put in place to ensure that public health would not be compromised by regulating the VOC content of such products. Because anti-microbial nonaerosol General Purpose Cleaner products may be considered health benefit products, in accordance with the statute, staff consulted with the California Department of Public Health (DPH). DPH staff indicated that reducing the VOC content of General Purpose Cleaner products should not affect the ability of manufacturers to sell efficacious anti-microbial general purpose cleaning products (CA DPH, 2010).

Proposed VOC Limit and Compliance:

The proposed VOC limit for nonaerosol General Purpose Cleaner products is 0.5 percent by weight, effective December 31, 2012. As shown in Table VII-6, using adjusted 2006 emissions, the proposed VOC limit will result in an estimated emission reduction of 7,460 pounds per day, or about 3.73 tons per day effective December 31, 2012.

**Table VII-6
General Purpose Cleaner Proposal**

Product Form	Proposed VOC Limit (percent)	Number of Complying Products	Complying Market Share (percent)	2012 Emissions Reductions (pounds per day)
Nonaerosol	0.5	980	69	7,460

Table VII-6 also shows that 980 products representing 69 percent of the market currently comply with the proposed limit. Data from the 2006 Survey also show complying products in each reported method of delivery. Although not shown, for FIFRA registered products, the complying market share is 73 percent.

The 0.5 percent by weight VOC limit is proposed based on staff's review of the data collected from the 2006 Survey as well as the review of existing technologies for use in cleaning applications. Reformulation options include the continued use of water along with various cleaning ingredients such as inorganic compounds (sulfates), LVP-VOC glycol ethers, triethanolamine, bleach, carbonates, ammonia, and surfactants. Because there are many viable low, and non-VOC alternatives available, as well as a high complying market share, we believe the proposed limit is commercially and technologically feasible.

Proposal to Prohibit Use of Alkylphenol Ethoxylate Surfactants:

Alkylphenol ethoxylate surfactants, in particular the octylphenol and nonylphenol ethoxylates, are known to be toxic to aquatic species. We are aware that some nonaerosol General Purpose Cleaner products contain these compounds. Because of this, ARB staff consulted with State Water Resources Control Board (SWRCB) staff to determine if continued use of these compounds could adversely affect water quality. Information provided to SWRCB staff indicates that alkylphenol ethoxylates were found in measurable concentrations in the State's receiving waters. Therefore, SWRCB staff expressed concern that any potential increased use of alkylphenol ethoxylate surfactants could adversely impact aquatic species (SWRCB, 2010a; SWRCB, 2010b; SCCWRP, 2010; and SFEI, 2010). In light of this finding, we are proposing a CEQA mitigation measure to ensure that use of alkylphenol ethoxylate surfactants does not occur as products reformulate. As proposed, section 94509(m)(3) would preclude use of alkylphenol ethoxylate surfactants in General Purpose Cleaner (nonaerosol) products effective December 31, 2012. Further information on this proposal, as well as the need, is contained in Chapters VI and IX.

Issues:

1. **Issue:** The proposed VOC limit is not commercially and/or technologically feasible.

Response: While working with stakeholders on this issue, staff thoroughly investigated the claim. At the request of stakeholders data were subdivided into all delivery mechanisms. Anti-microbial products were also evaluated. Complying products are available in every type of delivery system. Therefore, staff believes that the proposed VOC limit is technologically and commercially feasible.

2. **Issue:** The proposed limit will negatively impact anti-microbial products.

Response: Survey data have shown that anti-microbial products are available at or below the proposed limit. The complying market share for anti-microbial products is 73 percent. It should also be noted that the most commonly used active ingredients for these products are quaternary ammonium compounds,

which are LVP-VOCs. DPH staff indicated that reducing the VOC content of General Purpose Cleaner products should not affect the ability of manufacturers to sell efficacious anti-microbial general purpose cleaning products (CA DPH, 2010).

3. **Issue:** An exemption should be provided for products that use an integrated cleaning system.

Response: The data show a high complying market share for General Purpose Cleaner products that perform similar tasks, *i.e.*, floor cleaning. Therefore, staff concludes that an exemption for products that employ an integrated system is not warranted. The data clearly show that the basic market demand can be met. Providing an exemption for specific delivery mechanisms would unnecessarily diminish emission reductions.

4. **Issue:** The proposed VOC limit is not feasible for 'wipe' products.

Response: It is important to note that a 'wipe' product is a method to deliver a liquid product. The VOC limit is feasible for liquid products.

D. General Purpose Degreaser (nonaerosol)

General Purpose Degreaser products are products labeled to remove or dissolve grease, grime, oil and other oil-based contaminants from a variety of substrates, including automotive or miscellaneous metallic parts. The General Purpose Degreaser category currently does not include the other regulated categories "Engine Degreaser," "General Purpose Cleaner," "Adhesive Remover," "Electronic Cleaner," "Electrical Cleaner," "Energized Electrical Cleaner," or "Metal Polish or Cleanser." Products used exclusively in solvent cleaning tanks or related equipment, such as cold cleaners, vapor degreasers, conveyORIZED degreasers, or film cleaning machines are not General Purpose Degreaser products. An additional exclusion is provided for industrial products that are (A) sold exclusively to establishments which manufacture or construct goods or commodities; and (B) are labeled "not for retail sale." Products designed to clean miscellaneous metallic parts by immersion in a container are also excluded.

Nonaerosol General Purpose Degreaser products are currently subject to a 4 percent by weight VOC limit, which has been in effect since December 31, 2004. In addition, use of the TACs methylene chloride, perchloroethylene, and trichloroethylene is prohibited. This prohibition became effective December 31, 2005.

The 2006 Survey provides the basis for our determination that it is commercially and technologically feasible to further reduce the VOC content of these products. Based on these data, staff is proposing to lower the VOC limit for nonaerosol products to 0.5 percent by weight. Modifications to the definition are also proposed.

We are proposing to amend the General Purpose Degreaser definition to clarify the exemption for products used at manufacturing facilities. At present the definition excludes products that are sold exclusively to facilities that manufacture or construct goods or commodities, and that are labeled “not for retail sale.” We have determined that the phrase “not for retail sale” is inadequate to describe these products used in the manufacturing process and that use of this term could allow for unintended products to meet this exemption criterion. We have also determined that in the normal chain of commerce, responsible parties for General Purpose Degreaser products sell products to distributors, who in turn, sell to manufacturing facilities. With this understanding, we are proposing to amend the exclusion to also allow distributors to sell directly to manufacturing facilities. To ensure that only products used in the manufacturing process itself meet the exclusion, we are proposing that these products must be labeled “For Manufacturing Use Only.” The phrase “not for retail sale,” for the purpose of this regulation, would be deleted. As proposed, this provision would become effective at the end of 2012. Until that time the current definition would remain in effect.

On or after December 31, 2012, a “General Purpose Degreaser” would be defined as: any product labeled to remove or dissolve grease, grime, oil and other oil-based contaminants from a variety of substrates, including automotive or miscellaneous metallic parts. “General Purpose Degreaser” does not include “Adhesive Remover,” “Electrical Cleaner,” “Electronic Cleaner,” “Energized Electrical Cleaner,” “Engine Degreaser,” “General Purpose Cleaner,” “Metal Polish or Cleanser,” or “Oven or Grill Cleaner.” “General Purpose Degreaser” also does not include products used exclusively in “solvent cleaning tanks or related equipment,” or products that are (A) exclusively sold directly or through distributors to establishments which manufacture or construct goods or commodities; and (B) labeled exclusively for “use in the manufacturing process only.” “Solvent cleaning tanks or related equipment” includes, but is not limited to, cold cleaners, vapor degreasers, conveyORIZED degreasers, film cleaning machines, or products designed to clean miscellaneous metallic parts by immersion in a container.

Note that in the proposed definition we are proposing a reorganization. Only the new provisions are shown in underline format. The exclusion for “Oven or Grill Cleaner” products is being proposed because of modifications proposed to the definition for the “Oven or Grill Cleaner” category definition. This is further described in part H of this chapter. In general, the Oven or Grill Cleaner category would be limited to products that are labeled exclusively to remove baked-on food soils. The definition would further clarify that if an Oven or Grill Cleaner product also makes claims that it is suitable for general degreasing, that product would be considered a “General Purpose Degreaser.”

Table VII-7 below summarizes the sales and emissions from nonaerosol General Purpose Degreaser products based on the results of the 2006 Survey (ARB, 2007e). The data for the 462 reported products have been grown, by population, to 2010. Total category sales from these products are about 87,931 pounds per day.

**Table VII-7
General Purpose Degreaser**

Product Form	Number of Products	2010 Category Sales (pounds per day)	2010 Market-Adjusted VOC Emissions (pounds per day)
Nonaerosol	462	87,931	3,816

Also shown in Table VII-7, estimated 2010 market-adjusted VOC emissions for nonaerosol General Purpose Degreaser products are 3,816 pounds per day, or about 1.9 tons per day in California. Although not shown in Table VII-7, the VOC content of nonaerosol General Purpose Degreaser products ranges from 0 to 100 percent by weight, with a sales-weighted average VOC content of about 3 percent by weight. A further explanation of the existence of products above the VOC limit is necessary.

Review of the 2006 Survey data show that many of the higher VOC content products reported are solvent degreasers which, for example, are used for automotive surface preparation prior to painting automotive surfaces. Such products correctly reported in the 2003 Survey in the unregulated category of "Multi-purpose Solvent." At the time of the 2006 Survey, Multi-purpose Solvent products were not subject to VOC restrictions. However, changes to the definition for Multi-purpose Solvent products that were approved in 2006 clarified that Multi-purpose Solvent products that make claims that they are suitable for use as a consumer product which meets another definition in section 94508(a) are not Multi-purpose Solvents and are subject to the Most Restrictive Limit provision in section 94512(a). Therefore, because automotive surface preparation products make degreasing claims, they were correctly reported in the 2006 Survey as General Purpose Degreaser products (ARB, 2004a; ARB, 2007e).

Product Use and Marketing:

General Purpose Degreaser products are used for a wide range of degreasing duties and many are marketed for use in industrial or manufacturing applications, automotive maintenance and repair, residential garage or machine shop areas, and similar settings. Products marketed for such applications typically remove petroleum-based greases, oils, hydrocarbon residues, greasy soils, motor oil, axle grease, hydraulic fluid, lithium grease, lubricant oils, silicones, or similar industrial or manufacturing fluids from hard surfaces. For example, products are used on machinery, concrete, equipment, plumbing or pipe-fittings, tools, floors, walls, miscellaneous metallic or nonmetallic parts, and automotive parts. Products are also used to degrease surfaces prior to applying paint.

In addition, General Purpose Degreaser products are marketed for use in food service areas including: supermarkets, restaurants, butcher shops or meat-cutting facilities, janitorial services, residential and institutional kitchen areas, and similar settings. Products marketed for such applications are formulated similarly to Oven or Grill Cleaner products and are generally labeled to remove food-related greases or soils.

These degreaser products can be used on floors, walls, countertops, stoves, ovens, grills, appliances or similar surfaces associated with food preparation. Proposed changes to the Oven or Grill Cleaner category definition would clarify that a product that is labeled as an oven or grill cleaner that makes claims that it is suitable for degreasing other hard surfaces is a General Purpose Degreaser.

The General Purpose Degreaser category includes products that are sold as ready-to-use (RTU) products or concentrates. Delivery mechanisms for RTU products are typically pump sprays or wipes. Products are sprayed, mopped, sponged, wiped, brushed, or poured directly onto surfaces. In addition, products can be used in automatic dispensing machines or pressure washer systems. It is common for concentrated products to display dilution/mixing recommendations and use instructions for: “pump spray,” “mop and bucket,” “automatic dispensing systems,” “foaming,” “sponge,” “pressure washer,” or combinations based on the surface or substrate, soil build-up, or method of application.

Products can be purchased through many sales outlets including grocery and drug stores, discount stores, wholesalers, mass merchandisers, hardware stores, warehouse stores, and home centers. Products are also sold to industrial or institutional users through distributors or through direct sales by the manufacturer.

Additional information on product use and marketing can be found in the “1997 Midterm Measures I,” “1999 Midterm Measures II,” and the “2006 CONS-2” “Initial Statement of Reasons for the Proposed Amendments to the Consumer Products Regulation” (ARB, 1997b; ARB 1999; ARB, 2006a).

Product Formulation:

There are many kinds of degreasing products, but most can be categorized as: alkaline water-based, solvent-based, or water-soluble. Product formulations also vary depending upon the target market. Factors affecting the strength of the degreaser include the product concentration, the solvent or solvents used, the pH of the product, and the type of surfactant used.

Nonaerosol General Purpose Degreaser product formulations often contain water and water-soluble solvents such as glycols, glycol ethers, d-limonene, and alcohols (ARB, 2007e). Nonionic surfactants, such as alcohol ethoxylates or alkylphenol ethoxylates, are also used. Many nonaerosol General Purpose Degreaser products are formulated to be moderately alkaline, with ingredients such as sodium and potassium silicates, alkali metal hydroxides, metasilicates, and ethanolamines. Buffering ingredients such as tetra-potassium pyrophosphate or ethylene diamine tetra-acetic acid (EDTA) are often found in relatively low concentrations and are used as pH adjusters. Further discussion of surfactant technologies is discussed in part C of this chapter.

Water-based degreasers for heavy degreasing applications often contain higher levels of sodium metasilicate, or other metallic carbonates, are of higher pH and generally

contain more glycol ethers such as 2-butoxyethanol, alcohols such as isopropyl alcohol, or d-limonene. Removal of biological oils and greases normally found in the home or restaurants, which are primarily triglycerides, can be done effectively by water-based, alkaline products with surfactants and little or no organic solvent (ARB, 2007e). Heavy-duty alkaline degreasers are often used in commercial or institutional applications such as food service facilities or for use in restaurants.

Many water-based or water containing nonaerosol General Purpose Degreaser products are also used to remove motor oils and heavy greases in machine and repair shop environments. Some products are formulated with enzymes or live bacteria cultures that can digest greases and oils.

Solvent-based products previously categorized as “Multi-purpose Solvent” can be up to 100 percent VOC solvent, and typically contain mineral spirits, VM&P Naphtha, toluene, xylenes, or other organic solvents. These products are used in surface preparation to dissolve grease, wax, or oil on automotive surfaces prior to painting. However, the 2006 Survey data also show that a number of very low VOC surface preparation degreaser products are sold.

Solvent-based products can also be formulated as an emulsion with solvents such as glycol ethers, alcohols, or d-limonene to loosen and solubilize soils such as oily/greasy grime, asphalt, creosote, resins, and wax from surfaces. These lipophilic soils are solubilized by water-in-oil emulsions. The water in the emulsion acts as a “carrier” for the solvent “continuous phase.” Because the solvent is on the outside, the emulsion does not have to break for the solvent to be directly exposed to the greasy/oily surface. Water-in-oil emulsions are an effective way to use lower amounts of VOC solvent in a General Purpose Degreaser product.

Water-rinsable degreasers are designed to degrease equipment or areas where high levels of oils are present, such as plant warehouse concrete floors. The degreaser can be pressure sprayed on the surface and wiped or rinsed off with water, at which time an emulsion forms, carrying away the product and oils with it. Water-soluble solvent degreasers range from those used for degreasing concrete driveways, around loading platforms, kitchens, or machine shop areas to specialized foam degreasers or clinging foam degreasers used to degrease meat-processing equipment. These products can contain hydrocarbon solvents, glycol ethers, and emulsifiers.

Proposed VOC Limit and Compliance:

The proposed VOC limit for nonaerosol General Purpose Degreaser products is 0.5 percent by weight, effective December 31, 2012. As shown in Table VII-8, using adjusted 2006 emissions, the proposed limit will result in an estimated emission reduction of 2,340 pounds per day, or about 1.17 tons per day in 2012.

**Table VII-8
General Purpose Degreaser Proposal**

Product Form	Proposed VOC Limit (percent)	Number of Complying Products	Complying Market Share (percent)	2012 Emissions Reductions (pounds per day)
Nonaerosol	0.5	232	73	2,340

Table VII-8 also shows that 232 products, representing over 70 percent of the market currently comply with the proposed VOC limit of 0.5 percent by weight for nonaerosol General Purpose Degreaser products. Complying products are formulated with surfactants such as alkyl benzene sulfonate, and alcohol ethoxylates; water conditioning agents such as polyacrylates, carbonates, phosphonates, gluconates, tetra-potassium pyrophosphate or ethylene diamine tetra-acetic acid (EDTA); alkaline or acid builders; and water. Complying products are also formulated with the following LVP-VOC ingredients: glycol ethers, methyl esters, triethanolamine, and hydrocarbon solvents.

To comply with the proposed VOC limit of 0.5 percent by weight, we predict manufacturers will reformulate products with based on use of: surfactant technologies; non-VOC alkaline ingredients; LVP-VOC solvent substitutions; or water-solvent emulsions using LVP-VOC glycol ethers or LVP-VOC hydrocarbon solvents.

Proposal to Prohibit Use of Alkylphenol Ethoxylate Surfactants:

Alkylphenol ethoxylate surfactants, in particular the octylphenol and nonylphenol ethoxylates, are known to be toxic to aquatic species. We are aware that some General Purpose Degreaser (nonaerosol) products contain these compounds. Because of this, ARB staff consulted with State Water Resources Control Board (SWRCB) staff to determine if continued use of these compounds could adversely affect water quality. Information provided to SWRCB staff indicates that alkylphenol ethoxylates were found in measurable concentrations in the State's receiving waters. Therefore, SWRCB staff expressed concern that any potential increased use of alkylphenol ethoxylate surfactants could adversely impact aquatic species (SWRCB, 2010a; SWRCB, 2010b; SCCWRP, 2010; and SFEI, 2010). In light of this finding, we are proposing a CEQA mitigation measure to ensure that use of alkylphenol ethoxylate surfactants does not occur as products reformulate. As proposed, section 94509(m)(3) would preclude use of alkylphenol ethoxylate surfactants in General Purpose Degreaser (nonaerosol) products effective December 31, 2012. Further information on this proposal, as well as the need, is contained in Chapters VI and IX.

E. Glass Cleaner (nonaerosol)

"Glass Cleaner" products are designed primarily for cleaning surfaces made of glass such as windows, mirrors, glass tabletops, and computer screens. Products designed solely for the purpose of cleaning optical materials used in eyeglasses, photographic

equipment, scientific equipment, or photocopying machines are excluded from the Glass Cleaner category. Products marketed as "Glass and Surface Cleaner" are also not included in this category; they are "General Purpose Cleaner" products.

Glass Cleaner products were first regulated under the Phase-I amendments approved by the Board approved in October of 1990 (ARB, 1990). At that time, the Board approved a VOC limit of 8 percent by weight for nonaerosol Glass Cleaner products, effective January 1, 1993. The current VOC limit for nonaerosol Glass Cleaner products is 4 percent by weight, which has been in effect since December 31, 2004.

The 2006 Survey provides the basis for our determination that it is commercially and technologically feasible to further reduce the VOC content of these products. Based on these data, staff is proposing to lower the VOC limit for nonaerosol Glass Cleaner products to 3 percent by weight.

Table VII-9 below summarizes the sales and emissions from nonaerosol Glass Cleaner products based on the results of the 2006 Survey (ARB, 2007e). The data for the 298 reported products have been grown, by population, to 2010. Total category sales from these products are about 149,812 pounds per day.

**Table VII-9
Glass Cleaner**

Product Form	Number of Products	2010 Category Sales (pounds per day)	2010 Market-Adjusted VOC Emissions (pounds per day)
Nonaerosol	298	149,812	6,685

As shown in Table VII-9, nonaerosol Glass Cleaner products have estimated VOC emissions of 6,685 pounds per day, or about 3.3 tons per day in California. Nonaerosol products represent 96 percent of Glass Cleaner products sold in California. Although not shown, the sales-weighted average VOC content is about 3.4 percent by weight.

Product Use and Marketing:

The Glass Cleaner (nonaerosol) category consists of cleaning products that are labeled for use on glass surfaces. In addition to window cleaning, these cleaners are used to remove soils from glass furniture, fixtures, mirrors, or special surfaces such as stained glass. Nonaerosol Glass Cleaner products are formulated as ready-to-use (RTU) pump spray or wipes, or as concentrates which require dilution by the consumer before use. Nonaerosol Glass Cleaner products are applied and wiped off with a cloth or paper towel. A very small number of products are diluted during use. These "hose-connect" products are designed for the cleaning of exterior glass surfaces and windows. Certain Glass Cleaner products also claim to provide special properties to the cleaned surface. For example, some products claim to provide anti-fogging properties.

Glass Cleaner products are sold to household consumers, janitors, hospitality industries and other commercial or institutional establishments for glass cleaning. They are available at grocery stores, discount stores, janitorial supply stores, and warehouse stores. They may also be sold directly to institutional and commercial facilities.

Glass Cleaner products are used by household, commercial, and industrial establishments. Depending on the cleaning application, both the delivery method and product form varies. RTU pump spray products appear to be preferred by the household consumer. In a household setting Glass Cleaner products are used to clean a variety of soils on glass surfaces such as food, grease, and oils (including sebum, such as fingerprints) in addition to dust and other particulate. Oily soils and particulate also need to be removed from inside vehicles windows. In addition, consumers use Glass Cleaner products to remove outdoor soils including mineral deposits, hard water stains, dirt, and heavier soils including animal deposits. To clean these household soils, desirable performance characteristics include ease of use, quick drying, and effectiveness in soil removal, such that the product does not produce or leave streaks and/or solids on the glass surface.

Most Glass Cleaner products sold to commercial and industrial establishments are concentrated products. Following dilution these products are applied to mirrors, high-rise exterior and interior windows, "clear-guards" at food establishments, along manufacturing lines, or other glass surfaces. End users can mix the appropriate parts of water and cleaner manually with measuring devices, but some vendors also supply closed-loop dispensing and proportioning systems for automated dilution. Dispensers and proportioners work by using a metering tip to mix the product with the recommended amount of water to proper concentration (Schafer, 2008).

Product Formulation:

Nonaerosol Glass Cleaner products are commonly formulated with a high water content. Short carbon chains alcohols such as isopropyl or ethyl and/or glycol ethers are used to dissolve oily soils. Some products are also formulated with vinegar (dilute acetic acid), exempt VOCs, and ammonia. Small amounts of surfactants are included to emulsify oily soils. The surfactant also creates a layer of foam which allows the product to cling to the surface. Fragrance is also routinely added in small amounts.

Proposed VOC Limit and Compliance:

The proposed VOC limit for nonaerosol Glass Cleaner products is 3 percent by weight, effective December 31, 2012. As shown in Table VII-10, the proposed VOC limit would result in an estimated emission reduction of 827 pounds per day, or 0.41 tons per day statewide in 2012.

**Table VII-10
Glass Cleaner Proposal**

Product Form	Proposed VOC Limit (percent)	Number of Complying Products	Complying Market Share (percent)	2012 Emissions Reductions (pounds per day)
Nonaerosol	3	165	10	827

As shown in Table VII-10, a large number of products already comply with the proposed 3 percent by weight VOC limit, however, the overall complying market share is relatively low. For most nonaerosol Glass Cleaner products, reformulation to meet the proposed VOC limit will involve adjusting the water content, reducing the amount of VOC solvents, or replacing VOC solvents with LVP-VOC solvents, exempt VOCs, or surfactants. We expect most noncomplying products will reformulate with a smaller amount of VOC glycol ether or alcohol, with the balance being water and surfactants.

Proposal to Prohibit Use of Alkylphenol Ethoxylate Surfactants:

Alkylphenol ethoxylate surfactants, in particular the octylphenol and nonylphenol ethoxylates, are known to be toxic to aquatic species. We are aware that some Glass Cleaner (nonaerosol) products contain these compounds. Because of this, ARB staff consulted with State Water Resources Control Board (SWRCB) staff to determine if continued use of these compounds could adversely affect water quality. Information provided to SWRCB staff indicates that alkylphenol ethoxylates were found in measurable concentrations in the State's receiving waters. Therefore, SWRCB staff expressed concern that any potential increased use of alkylphenol ethoxylate surfactants could adversely impact aquatic species (SWRCB, 2010a; SWRCB, 2010b; SCCWRP, 2010; and SFEI, 2010). In light of this finding, we are proposing a CEQA mitigation measure to ensure that use of alkylphenol ethoxylate surfactants does not occur as products reformulate. As proposed, section 94509(m)(3) would preclude use of alkylphenol ethoxylate surfactants in Glass Cleaner (nonaerosol) products effective December 31, 2012. Further information on this proposal, as well as the need, is contained in Chapters VI and IX.

Issues:

1. **Issue:** The proposed 3 percent VOC limit should be lower.

Response: Staff's evaluation of the 2006 Survey indicate that the complying market share at the proposed 3 percent limit is low (about 10 percent). Although there are a number of products that comply, their overall sales are low. Some of the complying products are designed solely to be diluted in a bucket for outdoor window cleaning. This type of product is not suitable for indoor use. Staff also reviewed data that show that when the amount of VOC cleaning solvent is reduced there are potential safety hazards. For example, in automotive glass,

streaks or haze left behind from inadequate cleaning, or excess residuals can lead to haze and unsafe driving conditions. Therefore, staff believes the 3 percent VOC limit is appropriate.

F. Heavy-duty Hand Cleaner or Soap (nonaerosol)

Heavy-duty Hand Cleaner or Soap products are designed to clean or remove difficult dirt and soils from the hand with or without the use of water. Products remove a variety of tough soils including oil, grease, grime, tar, shellac, putty, printer's ink, paint, graphite, cement, carbon, asphalt, or adhesives. The Heavy-duty Hand Cleaner or Soap category does not include prescription drug products, Antimicrobial Hand or Body Cleaner or Soap, Astringent/Toner, Facial Cleaner or Soap, General-use Hand or Body Cleaner or Soap, or Rubbing Alcohol.

Heavy-duty Hand Cleaner or Soap products are currently subject to a VOC limit of 8 percent by weight for all product forms, which has been in effect since January 1, 2005 (ARB, 1997a). A description of these products is also included in the staff report for that rulemaking, the Midterm Measures I (ARB, 1997b).

In this rulemaking, we are proposing to reduce the VOC limit to 1 percent by weight for nonaerosol Heavy-duty Hand Cleaner or Soap products. These products are sold as liquids (which include wipes and pump spray), semisolids, and solids. The current VOC limit of 8 percent by weight for aerosol Heavy-duty Hand Cleaner or Soap products will be retained.

Table VII-11 below summarizes the sales and emissions from nonaerosol Heavy-duty Hand Cleaner or Soap products based on the results of the 2006 Survey (ARB, 2007e). The data have been grown, by population, to 2010. Total category sales for the 255 reported products are about 26,093 pounds per day.

**Table VII-11
Heavy-duty Hand Cleaner or Soap**

Product Form	Number of Products	2010 Category Sales (pounds per day)	2010 Market-Adjusted VOC Emissions (pounds per day)
Nonaerosol	255	26,093	1,585

Table VII-11 also shows the 2010 market-adjusted VOC emissions are 1,585 pounds per day, or about 0.79 tons per day, statewide. Although not shown, the sales-weighted average VOC content is about 4.6 percent.

Product Use and Marketing:

Nonaerosol Heavy-duty Hand Cleaner or Soap products are found and used in the home, garage, business, manufacturing, construction and mobile business settings

(CSPA, 2010b). These products are commonly used to remove the toughest dirt and soils that cannot be easily washed off with general-use soaps. Typically, the hand cleaner is rubbed into dry or wet hands until the dirt and soils are dissolved or suspended in the product. In the 2006 Survey, about 10 percent of the liquid products reported were towelette (wipe) products. Except for towelette products, virtually all the products instruct the user to wipe the hands with a towel or cloth to remove the dirt or soil suspended in the product, or first rinse with water and then follow with hand wiping. After rinsing with water, hands are often dried with a towel or cloth to aid in mechanically removing product or any stubborn soils that remain on the skin (Willard *et. al*, 2005).

Nonaerosol Heavy-duty Hand Cleaner or Soap products are typically sold in automotive supply stores, discount stores, hardware stores, home supply stores, paint stores, hobby and craft stores, and through Internet sales and catalog sales. These products are also sold to industrial or institutional users through distributors or through direct sales by the manufacturers.

Product Formulation:

Nonaerosol Heavy-duty Hand Cleaner or Soap products typically contain water, surfactants (anionic and nonionic), VOC and/or LVP-VOC solvents, and abrasives. These ingredients assist in removing tough dirt and soils from the hands. In addition, nonaerosol Heavy-duty Hand Cleaner or Soap products may contain fragrance and moisturizing agents. The VOC content of the reported nonaerosol Heavy-duty Hand Cleaner or Soap products ranges from 0 to 8 percent by weight.

Nonaerosol Heavy-duty Hand Cleaner or Soap products are commonly formulated with water in combination with surfactants to suspend dirt and grease. Approximately 95 percent of the products reported in the 2006 Survey reported having water in the product formulation. In products containing water, the water content ranged from near 0 to 95 percent by weight, with a sales-weighted average of approximately 60 percent (ARB, 2007e).

Use of both anionic and nonionic surfactants is common. Among the surfactants used are diethanolamine, sodium lauryl sulfate, alkylphenol ethoxylates, ethoxylated alcohols, and PEG-6 tridecyl ether (ARB, 2007e).

Typical VOC solvents used in nonaerosol Heavy-duty Hand Cleaner or Soap products include hydrocarbon solvents, such as mineral spirits, and terpenes, such as d-limonene. These hand cleaners have a VOC content ranging from 1 to 8 percent by weight. The VOC solvents may act as both an active ingredient by dissolving dirt and soils, or as a carrier for other ingredients. Use of LVP-VOC hydrocarbon and methyl ester solvents was also reported.

Abrasives are active ingredients which remove dirt through physical action. Examples of abrasives are pumice, silica, diatomaceous earth, and polybeads. Bio-based

abrasives include ground nut shells or seeds and corn cob grit. Products with abrasives typically come with use instructions to towel off or rinse off the product with water after the cleansing process to achieve residue-free hands (ARB, 2007e). As reported in the 2006 Survey, the amount of abrasives used in nonaerosol Heavy-duty Hand Cleaner or Soap products ranges from 0 to 53 percent of the product weight, with a sales-weighted average of about 8 percent by weight.

Moisturizers and fragrances may be included in the formulation of nonaerosol Heavy-duty Hand Cleaner or Soap products. Common moisturizers include aloe vera, jojoba oil, lanolin, and mineral oil to help condition the skin and prevent drying.

A number of nonaerosol Heavy-duty Hand Cleaner or Soap products are labeled to remove paint and adhesives from the hands. Most, if not all of these hand cleaners, contain the dibasic esters dimethyl adipate or dimethyl succinate. Dimethyl succinate is a VOC while dimethyl adipate is a LVP-VOC. Both are used in the formulation because of their ability to dissolve the paint resins (ARB, 2007e).

Proposed VOC Limit and Compliance:

The proposed VOC limit for nonaerosol Heavy-duty Hand Cleaner or Soap products is 1 percent by weight with an effective date of December 31, 2013. As shown in Table VII-12, the proposed VOC limit would result in emission reductions of 1,051 pounds per day, or about 0.53 tons per day, statewide in 2013.

Also shown in Table VII-12, 113 products, representing 30 percent of the market already comply with the proposed VOC limit of 1 percent by weight, demonstrating that the proposed VOC limit is technologically and commercially feasible.

**Table VII-12
Heavy-duty Hand Cleaner or Soap Proposal**

Product Form	Proposed VOC Limit (weight percent)	Number of Complying Products	Complying Market Share (percent)	2013 Emissions Reductions (pounds per day)
Nonaerosol	1	113	30	1,051

For most nonaerosol Heavy-duty Hand Cleaner or Soap products, reformulation to meet the proposed VOC limit of 1 percent by weight will involve adjusting the water content, reducing the amount of VOC solvents or replacing VOC solvents with LVP-VOC solvents, increasing the amount of surfactants or abrasives, or a combination of the above. The proposed limit will not require a change in the amount of moisturizing agents (aloe vera, jojoba oil, lanolin, mineral oil) used in the formulation of the product. These moisturizing agents are LVP-VOCs which are not counted toward a product's VOC content.

Approximately 60 percent of the 113 products that comply with the proposed VOC limit of 1 percent by weight contain abrasives. Thus, use of these materials appears to be a viable reformulation strategy.

To allow manufacturers the needed time to reformulate all noncomplying products, staff is proposing December 31, 2013, as the effective date of the proposed VOC limit.

Proposal to Prohibit Use of Alkylphenol Ethoxylate Surfactants:

Alkylphenol ethoxylate surfactants, in particular the octylphenol and nonylphenol ethoxylates, are known to be toxic to aquatic species. We are aware that some Heavy-duty Hand Cleaner or Soap (nonaerosol) products contain these compounds. Because of this, ARB staff consulted with State Water Resources Control Board (SWRCB) staff to determine if continued use of these compounds could adversely affect water quality. Information provided to SWRCB staff indicates that alkylphenol ethoxylates were found in measurable concentrations in the State's receiving waters. Therefore, SWRCB staff expressed concern that any potential increased use of alkylphenol ethoxylate surfactants could adversely impact aquatic species (SWRCB, 2010a; SWRCB, 2010b; SCCWRP, 2010; and SFEI, 2010). In light of this finding, we are proposing a CEQA mitigation measure to ensure that use of alkylphenol ethoxylate surfactants does not occur as products reformulate. As proposed, section 94509(m)(3) would preclude use of alkylphenol ethoxylate surfactants in Heavy-duty Hand Cleaner or Soap (nonaerosol) products effective December 31, 2013. Further information on this proposal, as well as the need, is contained in Chapters VI and IX.

Issues:

1. **Issue:** A proposed 1 percent by weight VOC limit for nonaerosol Heavy-duty Hand Cleaner or Soap products could result in an increase in the use of LVP-VOC ingredients. Substituting VOC ingredients with LVP-VOC ingredients would contribute to increased product residue left on hands, making hands sticky or slippery. This potentially causes unsafe situations for emergency response and utility workers out in the field without a source of running water.

Response: Staff identified that one reformulation option is to use more LVP-VOC ingredients. However, the commenter did not provide sufficient information to staff to support their claims that such reformulated products would result in more residue left on hands and lead to unsafe situations. Use instructions on the labels indicate that products intended to be used without water are to be wiped off with paper towels or cloths; this action should remove much of the residue from the hands. Complying towelette products were also reported in the 2006 Survey. In addition, staff contacted representatives of potential users, including fire fighters, emergency medical technicians (EMT), and utility workers. Staff was told that these workers typically wear gloves when out on calls. According to the organizations contacted by staff, firefighters do not take nonaerosol Heavy-duty Hand Cleaner or Soap products out on calls but

would use such products to clean their hands upon their return to the station. EMTs do not take nonaerosol Heavy-duty Hand Cleaner or Soap out on calls. A utility representative indicated that the field workers do take nonaerosol Heavy-duty Hand Cleaner or Soap products with them but use of such products is limited because the workers would be wearing gloves.

2. **Issue:** Products with 1 percent by weight VOC content would not meet the rigorous performance requirements of heavy-duty hand cleaners.

Response: Heavy-duty Hand Cleaner or Soap product is currently defined as a product designed to clean or remove difficult dirt and soils such as oil, grease, grime, tar, shellac, putty, printer's ink, paint, graphite, cement, carbon, asphalt, or adhesives from the hand with or without the use of water. According to label claims, many of the 113 complying products reported in the 2006 Survey are designed to clean or remove a variety of such soils.

3. **Issue:** A proposed 1 percent by weight VOC limit for nonaerosol Heavy-duty Hand Cleaner or Soap products could result in an increase in the use of abrasive ingredients. Increased amounts of abrasive ingredients will potentially be washed "down the drain," impacting water treatment and increasing solid waste.

Response: Staff identified that a reformulation option is to use more abrasive ingredients. However, staff has no reason to believe that the reformulation of nonaerosol Heavy-duty Hand Cleaner or Soap products would have significant adverse impacts on water treatment or solid waste disposal systems. Approximately 60 percent of the 113 products that comply with the proposed VOC limit of 1 percent by weight contain abrasives with 12 products containing less than 1 percent by weight. About half of the complying products contain very little or no abrasive ingredients, indicating that product reformulations that do not rely on increase use of abrasives are just as likely.

4. **Issue:** CSPA and its members have provided ARB staff with a counterproposal for a VOC limit of 5 percent by weight.

Response: As shown by the 2006 Survey, numerous products currently comply with staff's proposed 1 percent by weight VOC limit and are available, and based on the sales data, are well accepted by consumers. In addition, the 30 percent complying market share, with 113 complying products out of 255 products, indicates that the proposed limit is both technologically and commercially feasible.

5. **Issue:** An exemption of 5 percent by weight should be provided for 'bio-based' VOC solvents. These solvents are better for the environment than are petroleum-based solvents.

Response: Use of petroleum-based solvents is not the only reformulation option. The data show that the proposed 1 percent limit is feasible using a variety of reformulation options. While some products are currently formulated with bio-based solvents such as d-limonene, many other products do not contain this VOC. Products can also be reformulated to meet the 1 percent VOC limit without petroleum-based solvents. For example use of the LVP-VOC bio-based soy methyl ester solvents is a feasible reformulation option. Products can also be formulated without VOC or LVP-VOC solvents. Use of surfactants with water, and use of bio-based abrasives are also feasible options.

G. Metal Polish or Cleanser

Metal Polish or Cleanser is defined as “any product designed or labeled to improve the appearance and/or protect finished metal, metallic, or metallized surfaces by physical or chemical action. To “improve the appearance” means to clean, remove, or reduce stains, impurities, or oxidation from surfaces or to make surfaces smooth and shiny. “Metal Polish/Cleanser” includes, but is not limited to metal polishes used on brass, silver, chrome, copper, stainless steel and other ornamental metals. “Metal Polish/Cleanser” does not include “Automotive Wax, Polish, Sealant or Glaze,” “Tire or Wheel Cleaner,” “Paint Remover or Stripper,” products designed and labeled exclusively for automotive and marine detailing, or products designed for use in degreasing tanks.”

A number of Metal Polish/Cleansers were reported for use on a single metallic surface. However, some Metal Polish/Cleansers are designed for use on a variety of substrates and are labeled as multi-surface Metal Polish/Cleansers.

Metal Polish/Cleansers were first regulated in 1997 (ARB, 1997b). Products were required to meet a VOC limit of 30 percent by weight, effective January 1, 2005. In the current rulemaking, we are proposing a further VOC reduction for Metal Polish/Cleansers. To maximize reductions, we are also proposing to divide the category into aerosol and nonaerosol product forms. We are also proposing to change the category name from Metal Polish/Cleanser to “Metal Polish or Cleanser” to clarify that products making either claim are subject to the VOC limits.

Table VII-13 below summarizes the sales and emissions of aerosol and nonaerosol Metal Polish or Cleanser products based on the results of the 2006 Survey (ARB, 2007e). The data for the 227 reported products have been grown, by population, to 2010. As shown in Table VII-13, category sales for the 73 reported aerosol products are about 2,097 pounds per day. The 154 reported nonaerosol products have sales of about 10,522 pounds per day.

**Table VII-13
Metal Polish or Cleanser**

Product Form	Number of Products	2010 Category Sales (pounds per day)	2010 Market-Adjusted VOC Emissions (pounds per day)
Aerosol	73	2,097	437
Nonaerosol	154	10,522	409

Table VII-13 also shows the 2010 market-adjusted VOC emissions for aerosol products are 437 pounds per day, or about 0.22 tons per day. Table VII-13 also shows that the 2010 market-adjusted VOC emissions for nonaerosol products are 409 pounds per day, or about 0.20 tons per day. Although not shown, the sales-weighted average VOC content is about 21 percent by weight for aerosol products and 4 percent by weight for nonaerosol products.

Product Use and Marketing:

As mentioned earlier, Metal Polish or Cleanser products are used to improve the appearance of finished metal, metallic or metalized surfaces by physical or chemical action. Metal Polish or Cleanser products remove dust, fingerprints, tarnish, and many products claim to provide protection from future tarnishing (CSPA, 2010a). Tarnish is the result of the reaction of metal surfaces with pollutants in the air. Pollutants, such as nitrogen oxides, sulfur oxides and carbon monoxide, dissolve in the moisture in the air to form acidic solutions. These acidic solutions further react with the metal surfaces to produce tarnish (CSPA, 2010a).

Because of the differences in metal hardness and uses, polishes are designed to work without scratching the metal (CSPA, 2010a). Silver and aluminum have a fairly soft surface. Brass, copper, bronze and pewter surfaces are considered to have intermediate hardness. Soft and intermediate surface cleaners remove soil build up and tarnish, and claim to leave a smooth polished surface, and prevent further oxidation and corrosion. Stainless steel and chrome surfaces are considered hard and more durable. Cleaners for these metals are designed to leave a streak free appearance, remove soils, and leave a protective coating.

Metal Polish or Cleanser products are used in both household and institutional settings. These products are available in aerosols; liquids; semisolids, such as pastes or creams; and solids (ARB, 2007e).

A household consumer will use these products for a variety of cleaning and polishing needs around the home. Examples include, cleaning and polishing appliances, jewelry, flatware, fireplace accessories, home furnaces, metal surfaced or coated items, decorative trim, appliances, kitchen or bathroom fixtures, brass doors, end plates, wall coverings and railings.

In institutional settings such as restaurants, hotels, office buildings and hospitals, Metal Polish or Cleanser products are used to clean metal objects such as stainless steel surfaces, brass railings, brass fixtures, stovetops and decorative objects.

Metal Polish or Cleaner products that clean by physical action include liquids, semisolids and solids. These products require some physical scrubbing action to clean and shine the metallic substrate. Liquid products are usually applied using a moist cloth. After a short period of time the product is rinsed off with water and wiped or buffed off with a clean sponge or cloth. Semisolids typically clean through abrasion. They are applied with a damp cloth, rubbed onto the substrate and then wiped or rinsed off with soap and water.

Metal Polish or Cleanser products that clean by chemical action are typically liquids and aerosols that have a higher VOC content. Generally, these products are applied using a clean soft cloth, allowed to dry after slight rubbing to loosen badly discolored areas, and polished with a soft, dry cloth. Some liquids are available as dips in which objects are placed into the container of liquid product, pulled out and wiped or rinsed off to get a clean shiny appearance. Aerosol products, based on product labels, appear to be used for quick spot cleaning to get into hard to clean crevices. According to the 2006 Survey, aerosol products are more widely used in the institutional market than the household market (ARB, 2007e).

Metal Polish or Cleanser products are sold at numerous locations such as department stores, grocery stores, hardware stores, hobby shops, warehouse stores, paint stores, and janitorial supply stores.

Product Formulation:

Metal Polish or Cleanser products are formulated with water and a variety of VOC ingredients. VOC ingredients reported include various hydrocarbon solvents, alcohols, terpenes, and/or glycol ethers. Limited use of xylenes and perchloroethylene was reported. A number of products also contain an LVP-VOC mineral oil which provides a protective coating on the surface. Some products also contain a small amount of fragrance. Depending on the function of the Metal Polish or Cleanser product, formulations may also include weak acids or ammonia. Ingredients, such as abrasive polishing agents, did not have to be specified in the 2006 Survey. However, review of product labels lists ingredients such as silica, diatomaceous earth, talc, chalk, pumice, or clay as the abrasive polishing agents. The type of abrasive polish agent used in products depends on the hardness of the metal to be polished.

The propellants reported for aerosol products are hydrocarbon blends of propane, butane, and iso-butane. The range of propellant reported is about 5 to 30 percent by weight.

A typical stainless steel cleaner product contains water, VOC hydrocarbon solvent, alcohol, d-limonene, fragrance, and an LVP-VOC mineral oil. Use of acetone was also

reported. The mineral oil deposits a protective coating on the surface. A hydrocarbon propellant is typically used in the aerosol product form, however, a few products reported use of carbon dioxide.

A typical tarnish remover contains water, VOC hydrocarbon solvent, alcohol, ammonia, LVP-VOC solvent, exempt compounds, clay or silica, acid, and/or fragrance. Hydrocarbon propellants are used in the aerosol product form.

A typical polish contains water, VOC hydrocarbon solvent, alcohol, glycol ether, LVP-VOC mineral oil, abrasives such as pumice, clay, or silica, inorganic compounds, ammonia, acid, and/or fragrance. Hydrocarbon propellants are typically used in the aerosol product form.

Proposed VOC Limit and Compliance:

The proposed VOC limit for aerosol Metal Polish or Cleanser products is 15 percent by weight. The proposed VOC limit for nonaerosol Metal Polish or Cleanser products is 3 percent by weight. These VOC limits would become effective December 31, 2012. As shown in Table VII-14, using adjusted emissions, the proposed VOC limits would result in VOC emission reductions of approximately 440 pounds per day, or about 0.22 tons per day in 2012.

Table VII-14
Metal Polish or Cleanser Proposal

Product Form	Proposed VOC Limit (weight percent)	Number of Complying Products	Complying Market Share (percent)	2012 Emissions Reductions (pounds per day)
Aerosol	15	20	35	140
Nonaerosol	3	96	78	300

Table VII-14 also shows 35 percent of the market already complies with the proposed aerosol VOC limit of 15 percent by weight. For nonaerosol products, 78 percent of the market complies with the proposed VOC limit of 3 percent by weight.

A typical complying nonaerosol stainless steel cleaner contains up to 80 percent water, with the balance being a combination of grouped LVP-VOC and alcohol. A typical complying aerosol stainless steel cleaner contains similar ingredients with about 10 percent hydrocarbon propellant.

A typical complying tarnish remover contains up to 64 percent water. Other reported ingredients include inorganic compounds, clay, small amounts of ammonia, VOC hydrocarbon solvent, and fragrance. A typical complying aerosol tarnish remover contains similar ingredients with about 10 percent hydrocarbon propellant.

A typical complying polish contains about 50 percent water. Other reported ingredients include inorganic compounds, silica, a small amount of mineral oil, a small amount of alcohol, and a weak acid. A typical complying aerosol polish contains similar ingredients with about 10 percent hydrocarbon propellant.

We expect noncomplying products to reformulate using similar ingredients and technologies as the current complying products. Reformulation options include use of water, LVP-VOC hydrocarbon solvents, abrasives, VOC exempt compounds, or any combination.

Proposal to Prohibit Use of Certain TAC Solvents:

We are proposing a CEQA mitigation measure to prohibit the use of the chlorinated TAC solvents methylene chloride, perchloroethylene, and trichloroethylene in Metal Polish or Cleanser products. The prohibition of these three solvents is necessary, particularly for methylene chloride and perchloroethylene, because they are exempt VOCs and could be used in reformulated products without 'counting' toward VOC content. For this rulemaking, staff's evaluation of the 2006 Survey data show formulation technologies that do not contain methylene chloride, perchloroethylene, or trichloroethylene are readily available, and are not needed to comply with the proposed limits. This provision would become effective on December 31, 2012. More information on this proposal is contained in Chapter IX, Environmental Impacts, Section E.

Proposed GWP Limit:

No compounds with GWP values at or above 150 were reported in the 2006 Survey for this category. However, to ensure that use of compounds with higher GWP values does not begin as products reformulate to comply with the proposed VOC limits, we are proposing a GWP limit of 150 for any chemical compound used in Metal Polish or Cleanser products, effective December 31, 2012. While this proposal would allow use of the non-VOC propellant, HFC-152a, we believe other reformulation options are more likely. The proposed limit would not apply to any chemicals present as contaminants, which in aggregate are 0.1 percent by weight or less. This limit is proposed as a mitigation measure under CEQA (see Chapter IX, Environmental Impacts, Section E). The proposed limit is contained in section 94509(n).

H. Oven or Grill Cleaner

"Oven Cleaner" products are designed to remove cooked or baked-on food soils from the inside of oven surfaces or similar cooking surfaces. Nonaerosol Oven or Grill Cleaner products are currently subject to a 1 percent by weight VOC limit, which has been in effect since December 31, 2008. At that time Oven Cleaner products were primarily caustic products.

As part of the 2006 Survey, data for grill cleaning products was obtained. Our evaluation of the grill cleaner products indicates that these products are similarly

formulated and have similar functions to Oven Cleaner products. Because they have similar functions we are proposing to add grill cleaning products into the existing Oven Cleaner category and rename the category to “Oven or Grill Cleaner.” Products in this combined category are often labeled as: “Oven Cleaner,” “Oven or Grill Cleaner,” “Oven Cleaner and Heavy Duty Degreaser,” “Grill and Fryer Cleaner,” or “Grill Cleaner.”

During our evaluation we also learned that less harsh VOC technologies are available as alternatives to caustic products. These products require a higher VOC content than would be allowed by the 1 percent VOC limit. Therefore, we are proposing to increase the VOC limit for Oven or Grill Cleaner products slightly to allow for use of these alternatives.

We are also proposing to clarify that an Oven or Grill Cleaner product making other general degreasing claims is a “General Purpose Degreaser” product. Likewise, we are proposing to clarify that a Oven or Grill Cleaner product making general cleaning claims is a “General Purpose Cleaner” product. The proposed changes to the definition are shown below in strikethrough/underline format.

“Oven or Grill Cleaner” means ~~any cleaning a product designed or labeled exclusively to clean and to remove dried or baked on greases and/or food deposits from oven walls food preparation and/or food cooking surfaces.~~ A product that is labeled as an “Oven or Grill Cleaner” that makes claims that it is suitable for degreasing other hard surfaces is a “General Purpose Degreaser.” A product that is labeled as an “Oven or Grill Cleaner” that makes claims that it is suitable for cleaning other hard surfaces is a “General Purpose Cleaner.”

Surfaces likely to be soiled with baked-on greases and/or deposits that would require use of an Oven or Grill Cleaner product include: ovens, grills, broilers, deep fat fryers, rotisseries, stove hoods, exhaust vents, oven racks, bakery carts, or drip pans.

Oven Cleaner products were defined and regulated under the Phase-I amendments approved by the Board in October 1990 (ARB, 1990). At that time, the Board approved an 8 percent by weight VOC limit for aerosol and pump spray product forms, and a 5 percent by weight VOC limit for liquid product forms. The VOC limits became effective on January 1, 1993.

At the November 16, 2006, hearing, the Board approved amendments to lower the VOC limit for nonaerosol Oven Cleaner products (thereby incorporating pump spray and liquid products into a single subcategory) to 1 percent by weight, effective December 31, 2008. The 1 percent by weight VOC limit for nonaerosol products was determined to be technologically and commercially feasible based on the data reported (ARB, 2004a). In addition, a prohibition on the use of the TACs methylene chloride, perchloroethylene, and trichloroethylene was put in place.

Table VII-15 below, summarizes the sales and emissions from the Grill Cleaner products that we are incorporating into the Oven or Grill Cleaner category

(ARB, 2007e). Data for the 111 reported products have been grown to 2010. As shown in Table VII-15, total Grill Cleaner product sales are about 32,898 pounds per day in California.

Table VII-15
Oven or Grill Cleaner *

Product Form	Number of Products	2010 Category Sales (pounds per day)	2010 Market-Adjusted VOC Emissions (pounds per day)
Aerosol	21	1,868	162
Nonaerosol	90	31,030	479

*Data are for Grill Cleaner products only. Oven Cleaner products were surveyed in 2003.

Table VII-15 also shows aerosol Grill Cleaner products have estimated VOC emissions of 162 pounds per day, or about 0.08 tons per day in California. Nonaerosol Grill Cleaner products have estimated VOC emissions of 479 pounds per day, or about 0.24 tons per day in California. Although not shown, the sales-weighted average VOC content is 8.7 percent by weight for aerosol products and 1.4 percent by weight for nonaerosol products.

Product Use and Marketing:

Oven or Grill Cleaner products are sold through a variety of sales outlets including supermarkets, home centers, grocery stores, drug stores, and by mass merchandisers. Oven or Grill Cleaner products are also sold to commercial or institutional users through distributors or through direct sales by the manufacturer.

Products are used to remove food soils from household, commercial, and industrial ovens and grills, as well as, other surfaces where polymerized food soils have accumulated. At normal cooking temperatures organic deposits of fats, greases, oils, proteins, and carbohydrates are converted into a polymerized film or mass of charred material. For removal, such polymerized or baked-on deposits require use of Oven or Grill Cleaner products. Collectively, as used here, we are employing the term “polymerized food soils” to describe the types of soils an Oven or Grill Cleaner product would be used to remove. Inorganic deposits of water, including insoluble salts of calcium, magnesium, iron, and manganese also require use of an Oven or Grill Cleaner to remove them. These deposits reduce heating efficiency, increase fire hazards and cause unpleasant odors. Dirty ovens or grills also distort the food's flavor and aroma and can promote or support the growth of microorganisms that can contaminate food or other materials or surfaces.

Product labels, especially those for caustic products, include precautionary recommendations to use protective eye goggles, and to wear long sleeves and rubber gloves when using the product. Directions for using products recommend protecting surfaces from overspray and to apply product to the bottom of the oven, then sides and

top evenly. Labels also indicate Oven or Grill Cleaner products can be used in warm or cold ovens. Following application the product should dwell for a period of time prior to wiping surface to remove materials.

Nonaerosol products are sold as ready-to-use (RTU) pump sprays or as liquid concentrates. Products can be applied using a brush, sponge, grill pad, or pump spray. Applying the product using a pump spray allows the product to be applied to vertical, overhead or inclined surfaces. For this reason, many liquid concentrate products include dilution instructions for use in re-usable pump spray bottles.

Product Formulation:

Oven or Grill Cleaner products use compounds that provide alkalinity for saponification (alkali reacts with fats to form soluble soap) along with solvents and surfactants to remove polymerized food soils. Solvents penetrate greases and assist in depolymerizing reacted food soils. When surfactants are present above the critical micelle concentration, they can act as emulsifiers that will allow a compound that is normally insoluble in water to dissolve.

The primary alkaline ingredients in Oven or Grill Cleaner products continue to be the caustic alkalis, sodium and potassium hydroxide. These compounds react with fats, partially converting them into their sodium or potassium salts which are water-soluble and easily removable. Products often contain 30 percent or more of sodium or potassium hydroxide.

Typical reported VOC solvents include 2-butoxyethanol, monoethanolamine, isopropyl alcohol, ethyl alcohol, amino methyl propanol, and d-limonene. Typical reported LVP-VOC solvents include diethylene glycol monobutyl ether, tripropylene glycol methyl ether, diethanolamine, and triethanolamine. Additional reported ingredients include sodium xylene sulfonate, alkylphenol ethoxylates, ethoxylated alcohols, tetrapotassium pyrophosphate, metallic carbonates, and metasilicates.

Proposed VOC Limit and Compliance:

We are proposing to incorporate grill cleaning products into the Oven or Grill Cleaner category. To allow the previously unregulated grill cleaner products the necessary time to reformulate, proposed subsection 94509(r) would specify that the VOC limits do not apply to these products until December 31, 2012.

Nonaerosol Oven Cleaner products are currently subject to a VOC limit of 1 percent by weight. When this limit was approved reported products relied on low or non-VOC caustic technologies. We have since learned of less harsh technologies introduced to provide alternatives to caustic products. To accommodate the use of these technologies we are proposing to increase the current VOC limit to 4 percent by weight for nonaerosol Oven or Grill Cleaner products. To expedite providing this alternative, as proposed, the limit revision would become effective when the amendments become

legally effective. As shown in Table VII-16, this proposal results in a small emission reduction shortfall of 240 pounds per day, or about 0.1 tons per day. However, other reductions from this proposal would offset this change. To arrive at the amount of VOC increase resulting from the proposal, data from the Oven Cleaner products surveyed in 2003 were considered.

**Table VII-16
Oven or Grill Cleaner Proposal**

Product Form	Proposed VOC Limit (weight percent)	Number of Complying Products	Complying Market Share (percent)	2012 Emissions Reductions (pounds per day)
Aerosol	8	18	87	> 0
Nonaerosol	4	81	99	- 240*

* Previously regulated oven cleaning products incorporated to arrive at the emissions increase. Some of these oven cleaning products will reformulate from 1 percent VOC by weight to 4 percent VOC by weight.

Table VII-16, also show 87 percent of the market already complies with the aerosol VOC limit of 8 percent. For nonaerosol products, 99 percent of the market complies with the proposed 4 percent VOC limit. We expect the few noncomplying products to reformulate using ingredients less harsh than the caustic alkalis sodium or potassium hydroxide. Reformulated products would likely reformulate using LVP-VOC glycol ethers, ethanolamines, ethoxylated alcohols, metallic carbonates, and meta-silicates.

Proposal to Prohibit Use of Alkylphenol Ethoxylate Surfactants:

Alkylphenol ethoxylate surfactants, in particular the octylphenol and nonylphenol ethoxylates, are known to be toxic to aquatic species. We are aware that some Oven or Grill Cleaner products contain these compounds. Because of this, ARB staff consulted with State Water Resources Control Board (SWRCB) staff to determine if continued use of these compounds could adversely affect water quality. Information provided to SWRCB staff indicates that alkylphenol ethoxylates were found in measurable concentrations in the State's receiving waters. Therefore, SWRCB staff expressed concern that any potential increased use of alkylphenol ethoxylate surfactants could adversely impact aquatic species (SWRCB, 2010a; SWRCB, 2010b; SCCWRP, 2010; and SFEI, 2010). In light of this finding, we are proposing a CEQA mitigation measure to ensure that use of alkylphenol ethoxylate surfactants does not occur as products reformulate. As proposed, section 94509(m)(3) would preclude use of alkylphenol ethoxylate surfactants in Oven or Grill Cleaner products effective December 31, 2012. Further information on this proposal, as well as the need, is contained in Chapters VI and IX.

I. Special-purpose Lubricant

The Special-purpose Lubricant category is not currently regulated. We are proposing to define “Special-purpose Lubricant” as a lubricant designed or labeled as: a cutting or tapping oil; an anti-seize product; an open gear, chain or wire lubricant; and products which claim to prevent and/or inhibit corrosion that makes a lubricating claim. The “Special-purpose Lubricant” category would not include the other regulated categories “Multi-purpose Lubricant,” “Silicone-based Multi-purpose Lubricant,” “Penetrant,” products designed and labeled exclusively to release manufactured products from molds, and products designed or labeled to provide lubricity solely by depositing a thin film of graphite, molybdenum disulfide (“moly”), or polytetrafluoroethylene or closely related fluoropolymer (“teflon”) on surfaces.

Special-purpose Lubricants are used in household, automotive, institutional, and industrial settings on metal parts to reduce friction, heat and wear between moving parts. Products that lubricate may also secondarily function to inhibit rust.

Table VII-17 below summarizes the sales and emissions from Special-purpose Lubricant based on the results of the 2006 Survey (ARB, 2007e). Data have been grown, by population, to 2010. As shown, Special-purpose Lubricant products have category sales of 29,600 pounds per day in California.

Table VII-17
Special-purpose Lubricant

Product Form	Number of Products	2010 Category Sales (pounds per day)	2010 Market-Adjusted VOC Emissions (pounds per day)
Aerosol	168	1,413	512
Nonaerosol	224	28,187	365

As shown in Table VII-17, Special-purpose Lubricant products are sold in both the aerosol and nonaerosol forms, with estimated VOC emissions of 877 pounds per day, or about 0.44 tons per day in California. Although not shown, the sales-weighted average VOC content of the aerosol and nonaerosol products are 36 and 1 percent by weight, respectively.

Product Use and Marketing:

Special-purpose Lubricant products are used by professionals and do-it-yourselfers in specific applications. These products are used on tools, all kinds of machinery, construction equipment, automotive and marine engines, and parts which need lubrication in order to function properly. They are also used for maintenance to reduce wear and extend the usable life of the substrate being lubricated.

Special-purpose Lubricant products have specific purposes, for example, cutting and tapping oils. These oils are used on drills, saws, and taps to extend tool life. Machining operations (e.g., sawing, milling, tapping, drilling, shaping, etc.) use various cutting oils depending on material. Besides lubricating, cutting and tapping oils also aid the cutting process by cooling or removing the heat generated due to friction between the tool and the surfaces. It can be a product which leaves a film after application for lubrication, or it may also be a fluid which continuously flows onto the moving parts to reduce heat and friction and improve tool efficiency.

Anti-seize lubricant products are typically used on machinery where seizing, fretting or galling of parts can be a problem due to extreme temperature and/or pressure conditions. Application of these products is especially important in environmentally adverse conditions such as high humidity and salinity, and acidic atmospheres. Anti-seize lubricant products contain powdered metallic additives such as zinc, copper, aluminum, and nickel or nonmetallic materials such as molybdenum disulfide, graphite, zinc oxide or calcium oxide. These additives enable the product to prevent the metal parts from seizing. A combination of these solid lubricating agents results in different high temperature limits and lubricities to suit specific needs.

In some applications rust preventative lubricant products are used to improve corrosion resistance to allow parts to be subsequently disassembled in a variety of settings. These formulas are also used to break down rust and corrosion, to free plumbing, rusted bolts and other fittings, release jammed or locked mechanisms, and corroded parts. Typically, these lubricants form a thin, anti-rust, nondrying film by displacing moisture which protects various metal surfaces.

Open gear, chain or wire lubricants penetrate, protect and preserve open gears, chains, bars, wire ropes, cables, hoists, pulleys, conveyors, forklifts, elevators, overhead door drives with minimum "throw-off" from centrifugal force.

Some products proposed for inclusion in the Special-purpose Lubricant category also makes claims that they are suitable in situations where there may be direct or indirect contact with food. These 'food grade' lubricants would be included in the category.

Special-purpose Lubricant products are sold primarily in hardware stores, automotive parts stores, and industrial supply houses. These products are also sold through distributors or through direct sales by the manufacturer to industrial or institutional users.

Product Formulation:

As reported in the 2006 Survey, Special-purpose Lubricant product formulations are typically composed of petroleum base oils. Petroleum distillates such as naphthenic and aliphatic hydrocarbons serve as the carrier fluid. Limited use of trichloroethylene, methylene chloride, or perchloroethylene was reported.

The VOC content of products in this category ranges from 0 to 100 percent by weight for both aerosol and nonaerosol products, with a sales-weighted average VOC content of 36 and 1 percent by weight for aerosol and nonaerosol products, respectively.

Special additives such as PTFE, greases, and powdered metals are sometimes used to accomplish the lubrication, depending on the application.

For aerosol products, hydrocarbon propellant (such as propane, butane, iso-butane) is most often used. In some cases carbon dioxide (CO₂) is used.

Proposed VOC Limit and Compliance:

The proposed VOC limit for Special-purpose Lubricant products is 25 percent by weight for aerosols and 3 percent by weight for nonaerosols, effective December 31, 2012. As shown in Table VII-18, using emissions adjusted to 2012, the proposed limits for the category will result in an estimated emission reduction of 461 pounds per day, or about 0.23 tons per day statewide.

Table VII-18
Special-purpose Lubricant Proposal

Product Form	Proposed VOC Limit (weight percent)	Number of Complying Products	Complying Market Share (percent)	2012 Emissions Reductions (pounds per day)**
Aerosol	25	64	47	207
Nonaerosol	3	166	97	254

Table VII-18 also shows that 47 percent of the aerosol market currently complies with the proposed 25 percent VOC limit, and 97 percent of the nonaerosol market complies with 3 percent VOC limit. Complying aerosol and nonaerosol products are already sold in each type of lubricant proposed for consolidation into the Special-purpose Lubricant category.

Staff has determined that reformulation to the proposed limits is technologically and commercially feasible. As shown in Table VII-18, the majority of nonaerosol products in this category already meet the proposed 3 percent limit. Additionally, the 47 percent complying market share demonstrates that aerosol products with VOC content at or below 25 percent are already available and well-accepted by consumers.

Reformulation options that can be used by manufacturers to meet the proposed limit include using LVP-VOC hydrocarbon solvents and acetone. Acetone is currently used in several Special-purpose Lubricant product formulations at a level of 10 to 50 percent. Another reformulation option is to use a non-VOC propellant such as CO₂ as a replacement for hydrocarbon propellants. CO₂ may also be used in combination with hydrocarbon propellants along with LVP-VOC or non-VOC solvents. However, because

CO₂ typically only constitutes about 2 to 5 percent of the overall formulation, additional reformulation techniques must be used in order to achieve compliance.

We expect that manufacturers will meet the proposed limit by using formulation technologies similar to complying products.

Proposal to Prohibit Use of Certain TAC Solvents:

We are proposing a CEQA mitigation measure to prohibit the use of the chlorinated TAC solvents methylene chloride, perchloroethylene, and trichloroethylene. The prohibition of these three solvents is necessary, particularly for methylene chloride and perchloroethylene, because they are exempt VOCs and could be used in reformulated products without ‘counting’ toward VOC content. The prohibition would become effective on December 31, 2012. Survey data show that the proposed limits can be met without the use of these compounds. More information on this proposal is contained in Chapter IX, Environmental Impacts, section E.

Proposed GWP Limit:

No compounds with GWP values above 150 were reported in the 2006 Survey for this category. However, to ensure that use of compounds with higher GWP values does not begin as products reformulate to comply with the proposed VOC limits, we are proposing a GWP limit of 150 for any chemical compound used in Special-purpose Lubricant products, effective December 31, 2012. While this proposal would allow use of the non-VOC propellant, HFC-152a, we believe other reformulation options are more likely. The proposed limit would not apply to any chemicals present as contaminants, which in aggregate are 0.1 percent by weight or less. This limit is proposed as a mitigation measure under CEQA (see Chapter IX, Environmental Impacts, section E). The proposed limit is contained in section 94509(n).

Issues:

1. **Issue:** Every kind of Special-purpose Lubricant cannot be accommodated by one VOC limit.

Response: All subcategories of Special-purpose Lubricant have been thoroughly evaluated and the proposed VOC limits have been found to be technologically and commercially feasible. Complying products were available in every surveyed subcategory in aerosol and nonaerosol forms.

J. Spot Remover (Dry Clean Only)

In the Consumer Products Regulation, “Spot Remover” means any product labeled to clean localized areas, or remove localized spots or stains on cloth or fabric such as drapes, carpets, upholstery, or clothing, that does not require subsequent laundering to achieve stain removal. “Dry Cleaning Fluid,” “Laundry Prewash,” and “aerosol products labeled solely for gum removal” are excluded from the definition of “Spot Remover.”

Spot Remover products that are used at dry cleaners and other commercial launderers for spot-cleaning and stain removal have been considered "Dry Cleaning Fluid" products. Therefore, these products have not been regulated under the category of "Spot Remover."

Spot Remover products were first regulated in 2001, when VOC limits of 25 percent by weight for the aerosol form and 8 percent by weight for the nonaerosol forms were adopted. In 2008, the Board approved amendments to lower the VOC limit for the aerosol form of Spot Remover products to 15 percent by weight, and the nonaerosol form to 3 percent VOC by weight. A prohibition on use of the TACs methylene chloride, perchloroethylene, and trichloroethylene, was also approved. These requirements are to become effective December 31, 2010 (ARB, 2009d).

To evaluate whether the exemption for Spot Remover (Dry Clean Only) products was still necessary, companies that sold spotting chemicals to dry cleaning establishments, or that sold household "dry cleaning" products, were surveyed for their 2008 California sales. The survey was titled, "2008 Survey Update for Dry Clean Only Spot Removers" (2008 Survey Update). The survey data review indicates that the exemption is no longer necessary. Therefore, ARB staff is proposing to remove the exclusion. This would mean that Spot Remover (Dry Clean Only) products would be subject to the VOC limits already in place.

Spot Remover (Dry Clean Only) products are also referred to in this section as "spotting agents," "spotters," or "spotting chemicals." These products are formulated to remove localized spots or stains on fabrics labeled for "dry clean only," or on "S-coded fabrics," such as clothing, rugs, curtains, or other similar items that can be cleaned by a commercial dry cleaning establishment or professional laundry facility. A few 'home use' products are available to the general public. "S-coded fabrics" refer to fabrics specified by the Joint Industry Fabric Standards Committee to be cleaned only with water-free spot cleaning products. Spotting chemicals may be intended for one type of stain, or for several (ARB, 2008a; and SCRDC, 2010). Industry separates spotting agents into two main categories: "dry-side" and "wet-side" (U.S. EPA, 1998b).

As their names imply, dry-side spotting agents are for garments and items that would be washed with nonaqueous solvents, *i.e.*, intended for a typical nonaqueous, solvent-based dry cleaning machine such as a perchloroethylene or hydrocarbon system. Dry-side spotters are for removing oil-based stains and spots, including but not limited to paint, grease, tar, and nail polish.

Wet-side spotting agents are for stains that are water-based, including but not limited to perspiration, grass stains, blood, certain foods or beverages, mustard and other plant-based stains. Some spotters are for both wet and dry-side stains.

To clarify the products that would be included or excluded from the definition of Spot Remover, staff is proposing modifications to three definitions. The proposed changes are presented in strikeout/underline format for ease of reviewing the edits.

1. Proposed modification to the definition of Spot Remover:

“Spot Remover” means any product labeled to clean localized areas, or remove localized spots or stains on cloth or fabric such as drapes, carpets, upholstery, or clothing, that ~~does~~ may or may not require subsequent laundering to achieve stain removal. “Spot Remover” includes spotting agents used by commercial launderers and dry cleaners. “Spot Remover” does not include ~~“Dry Cleaning Fluid,”~~ “Laundry Prewash,” or aerosol products labeled solely for gum removal.

This modification is necessary to clarify that spotters used at commercial launderers and dry cleaners are considered "Spot Remover" products.

2. Proposed modification to the definition of Dry Cleaning Fluid:

~~“Dry Cleaning Fluid” means any non-aqueous liquid product~~ nonaqueous solvent that is (A) used in dry-cleaning machines at commercial dry cleaners or used by commercial businesses that clean fabrics such as draperies at the customer’s residence or work place; and (B) is designed and labeled exclusively to clean for use on: (1) fabrics which are labeled “for dry clean only,” such as clothing or drapery; or (2) “S-coded” fabrics. ~~“Dry Cleaning Fluid” includes, but is not limited to, those products used by commercial dry cleaners and commercial businesses that clean fabrics such as draperies at the customer’s residence or work place.~~ “Dry Cleaning Fluid” does not include “Spot Remover” or “Carpet/Upholstery Cleaner.” For the purposes of this definition, S-coded fabric means an upholstery fabric designed to be cleaned only with water-free spot cleaning products as specified by the Joint Industry Fabric Standards Committee.”

This modification is intended to clarify that “Dry Cleaning Fluid” means only the solvent used in dry cleaning machines. Spotting chemicals would no longer be considered "Dry Cleaning Fluid" products.

3. Proposed modification to the definition of Laundry Prewash:

“Laundry Prewash” means a product that is designed for application to a fabric prior to laundering in a wet-cleaning process, and that supplements and contributes to the effectiveness of laundry detergents and/or provides specialized performance.

This modification is intended to clarify that a “Laundry Prewash” is a product used in a cleaning process that uses water as the solvent.

Table VII-19 below summarizes the sales and emissions, grown to 2010, for Spot Remover (Dry Clean Only) products (ARB, 2009e). Total category sales are about 860 pounds per day, or 0.43 tons per day in California.

**Table VII-19
Spot Remover (Dry Clean Only) ***

Product Form	Number of Products	2010 Category Sales (pounds per day)	2010 Market-Adjusted VOC Emissions (pounds per day)
Aerosol **	< 5	< 10	< 10
Nonaerosol	49	860	350

* Based on 2008 Dry Clean Only Spot Remover Survey (ARB, 2009e).

** Data estimated to preserve confidentiality.

As shown in Table VII-19, Spot Remover (Dry Clean Only) products are sold in both the aerosol and nonaerosol forms, with total estimated VOC emissions of 350 pounds per day, or about 0.17 tons per day in California. Although not shown, the sales-weighted average VOC content for the aerosol and nonaerosol Spot Remover (Dry Clean Only) product forms is about 25 and 40 percent by weight, respectively.

Product Use and Marketing:

Spot Remover (Dry Clean Only) products are used by commercial laundering or dry cleaning establishments, for cleaning localized spots, stains, and soiled areas on items which include, but are not limited to, articles of clothing labeled “dry clean only;” delicate fabrics, leather items such as jackets, belts, and purses; window coverings, and rugs.

Articles that can be laundered are cleaned in a dry cleaning or wet-cleaning machine after “pre-spotting” with the spot remover product. Pre-spotting involves the article being placed on the establishment’s “spotting board,” where the spotting chemical is applied to the stain or spot, the area may be agitated with a brush or spatula, then the article may be left to sit a few minutes before laundering in the dry cleaning machine or washing machine. The spotting chemical is not allowed to dry before the article goes into the machine for laundering.

If an article is unsuitable for laundering, such as a purse or belt, it would undergo the same procedure as an article that still has a spot or stain after the machine cleaning, called “post-spotting.” Post-spotting is a procedure where the spotting chemical is applied to a spot or stain, agitated with a brush or spatula, then may be blotted dry, or rinsed with a solvent, water, or steam, if appropriate. The article is then air-dried. The spotting chemical or rinse is intended to evaporate after use without leaving a residue. The article does not then need to be re-cleaned after the post-spotting application (ARB, 2009e).

Spot Remover (Dry Clean Only) products are typically sold to dry cleaning establishments and professional laundering facilities through the products’ manufacturers and their distributors. Marketing is done through catalogs, trade magazines, and on the Internet. Only a few products are intended for the household market.

Product Formulation:

Dry-side spotting agents are mainly formulated with nonaqueous solvents, meaning they have little or no water content. In the 2008 Survey Update, the most common reported ingredients include trichloroethylene, glycol ethers, amyl and butyl acetate, methyl isobutyl ketone, and VOC hydrocarbon solvents. A small amount of methylene chloride was reported. Some complying dry-side spotting agents contain LVP-VOC hydrocarbon solvents and LVP-VOC glycol ethers.

Wet-side spotting agents are generally water-based products containing ingredients such as glycol ethers, surfactants, enzymes, and various inorganic cleaning compounds. Ingredients vary depending on the types of spots and stains to be removed, although many products are formulated for general use to address several types of stains. A common VOC ingredient is ethylene glycol monobutyl ether which is used to treat many oil-based and water-based stains. LVP-VOC glycol ethers are also used (ARB 2009e).

Many complying products reported in this category were wet-side spotting agents. Technically these water-based products do not meet the definition of “Dry Cleaning Fluid.” From this observation, we infer there has already been a shift in the market due to phase-out of perchloroethylene from dry cleaning operations, as required by the Airborne Toxic Control Measure for Emissions of Perchloroethylene from Dry Cleaning and Water-Repelling Operations (ARB, 2007b).

The aerosol products were consistent in formulation with the Spot Remover products that are currently regulated. The reported emissions from the aerosol products were negligible compared to the nonaerosol products (ARB, 2009e).

The reported nonaerosol products were generally liquids dispensed from a jar, can, tube, or squeeze-tube. Most low-VOC products were water-based, and formulations included LVP-VOC ingredients, such as surfactants and LVP-VOC glycol ethers, and inorganic ingredients. Some products were sold in concentrated liquid form. Specialized products also exist in this category. For example, products containing non-VOC inorganic acids or bases are used to remove rust and certain water-based stains (ARB, 2009e).

Proposed Limits and Compliance:

ARB staff is proposing to incorporate Spot Remover (Dry Clean Only) products into the currently regulated Spot Remover category. As such, aerosol and nonaerosol spotting products would need to comply with the 15 percent by weight and 3 percent by weight VOC limits, respectively. These VOC limits for Spot Remover products are to become effective December 31, 2010. To provide industry with the necessary time to reformulate the newly added products to meet the limits, we believe extending the effective date is appropriate; it would be difficult, from an enforcement perspective, to discern currently regulated products from those being newly added. Therefore, we are

proposing to extend the effective date for two years, until December 31, 2012. This proposal would result in delaying 573 pounds per day, or about 0.29 tons per day of VOC emission reductions until the end of 2012.

As shown in Table VII-20, using emissions adjusted to 2012, the proposed limits for the category will result in an estimated emission reduction of 340 pounds per day, or about 0.17 tons per day statewide.

Table VII-20
Spot Remover (Dry Clean Only) Proposal *

Product Form	Proposed VOC Limit (weight percent)	Number of Complying Products	Complying Market Share (percent)	2012 Emissions Reductions (pounds per day)
Aerosol **	15	< 5	< 5	< 3
Nonaerosol	3	16	46	340

* Based on 2008 Dry Clean Only Spot Remover Survey Update (ARB, 2009e).

** Data estimated to preserve confidentiality.

The staff report for the 2008 CONS-II amendments provides information on commercially and technologically feasible reformulation options for aerosol Spot Remover (Dry Clean Only) products to meet the 15 percent by weight VOC limit (ARB, 2008a). Non-VOC propellant options are available, which would allow reformulated products to contain up to 15 percent by weight VOC solvent such as ethylene glycol monobutyl ether. A combination of VOC hydrocarbon propellant with LVP-VOC solvents, inorganic ingredients, or exempt compounds is another viable alternative to reformulate dry-side spotting agents.

The proposed VOC limit for nonaerosol Spot Remover (Dry Clean Only) products would allow up to 3 percent by weight VOC ingredients such as ethylene glycol monobutyl ether. The balance would be primarily water along with LVP-VOC solvents, surfactants, enzymes, inorganic compounds, or other exempt compounds (ARB, 2009e). In its report on alternative spotting chemicals tested in dry cleaning establishments, the Institute for Research and Technical Assistance found several nonaerosol formulations that were effective and met the proposed 3 percent by weight VOC limit (IRTA, 2009).

Additionally, at the end of 2010, prohibitions on the use of the TACs methylene chloride, perchloroethylene, trichloroethylene were to become effective. The newly added spotting products would also be subject to these prohibitions. The proposal to extend the effective date to December 31, 2012, would apply to these provisions as well.

Proposal to Prohibit Use of Certain TAC Solvents:

“Spot Remover” products that are currently regulated are subject to a prohibition on use of methylene chloride, perchloroethylene, and trichloroethylene. We are proposing to prohibit the use of the chlorinated TAC solvents methylene chloride, perchloroethylene, and trichloroethylene in these newly added products. The prohibition of these three solvents is necessary, particularly for methylene chloride and perchloroethylene, because they are exempt VOCs and could be used in reformulated products without ‘counting’ toward VOC content. The provision would become effective on December 31, 2012. Staff’s evaluation of the 2008 Survey Update data show formulation technologies that do not contain methylene chloride, perchloroethylene, or trichloroethylene are readily available, and are not needed to comply with the proposed standard. More information on this proposal is contained in Chapter IX, Environmental Impacts, section E.

Proposed GWP Limit:

A small amount of hydrochlorofluorocarbon-141b (HCFC-141b) was reported. However, we have since learned that products containing this compound are no longer sold in California. Other than HCFC-141b, no compounds with GWP values at or above 150 were reported in the 2008 Survey Update for this category. However, to ensure that use of compounds with higher GWP values does not begin as products reformulate to comply with the proposed VOC limits, we are proposing a GWP limit of 150 for any chemical compound used in Spot Remover (Dry Clean Only) products, effective December 31, 2012. While this proposal would allow use of the non-VOC propellant, HFC-152a, we believe other reformulation options are more likely. The proposed limit would not apply to any chemicals present as contaminants, which in aggregate are 0.1 percent by weight or less. This limit is proposed as a mitigation measure under CEQA (see Chapter IX, Environmental Impacts, section E). The proposed limit is contained in section 94509(n).

Issues:

1. **Issue:** Some dry cleaning establishments are using spotting chemicals that contain the solvent normal-propyl bromide (n-PB). The Bay Area Air Quality Management District banned this chemical from dry cleaning spotters in its jurisdiction, and ARB should do the same because of n-PB’s potential reproductive and neurotoxic effects.

Response: The chemical n-PB is a VOC. As such, ARB staff has determined that the VOC limits are sufficiently low such that use of n-PB, if any, will be negligible. Therefore, a prohibition is not needed.

K. Wasp or Hornet Insecticide (aerosol)

“Wasp or Hornet Insecticide” means any insecticide product that is designed for use against wasps, hornets, yellow jackets or bees by allowing the user to spray from a distance a directed stream or burst at the intended insects, or their hiding place. The Wasp or Hornet Insecticide category does not include products that are used to repel these insects.

Aerosol Wasp or Hornet Insecticide products are currently subject to a 40 percent by weight VOC limit, which has been in effect since January 1, 2005. Wasp or Hornet Insecticide products were first regulated under the “Midterm-measures II” amendments approved in October 1999. A description of these products is included in the staff report for that rulemaking (ARB, 1999).

The 2006 Survey provides the basis for our determination that it is technologically and commercially feasible to further reduce VOCs from these products. Based on these data, staff is proposing to lower the VOC limit for aerosol Wasp or Hornet Insecticide products to 10 percent by weight. We are also proposing to change the category name from “Wasp and Hornet Insecticide” to “Wasp or Hornet Insecticide” and limit the use of compounds with higher GWP values.

Product Use and Marketing:

Table VII-21 summarizes the sales and emissions from aerosol Wasp or Hornet Insecticide products (ARB, 2007e). The data have been grown, by population, to 2010. As shown in Table VII-21, the 56 aerosol Wasp or Hornet Insecticide products reported have estimated category sales of 6,112 pounds per day in California.

Table VII-21 also shows the 2010 market-adjusted VOC emissions are 618 pounds per day, or about 0.31 tons per day in California. Although not shown, the sales-weighted average VOC content for this category is 10.1 percent by weight, excluding fragrance.

Table VII-21
Wasp or Hornet Insecticide

Product Form	Number of Products	2010 Category Sales (pounds per day)	2010 Market-Adjusted VOC Emissions (pounds per day)
Aerosol	56	6,112	618

Product Use and Marketing:

Aerosol Wasp or Hornet Insecticide products are used by household consumers and institutional consumers, such as utility or telecommunication company’s workers. These products must enable the user to knockdown and kill the insects rapidly to avoid attack.

Most products dispense the insecticide in a liquid jet stream while a few produce a foam which blankets the insect or nest.

Wasp or Hornet Insecticide products can be purchased through supermarkets, drug stores, discount stores, mass merchandisers, hardware stores, garden and landscape supply stores, warehouse stores, and home centers. Consumers may also purchase products through catalog sales and the Internet.

Wasp or Hornet Insecticide products sold within California must be registered with California's DPR in addition to being FIFRA registered. These registrations are designed to thoroughly evaluate the insecticide product to ensure it meets both federal and State requirements to protect public health and the environment. As part of the registration process, the efficacy data are reviewed to validate the spectrum of activity. The Consumer Products Regulation allows FIFRA registered products an additional year for compliance to allow the necessary time to complete the registration.

Control of wasps or hornets is sometimes difficult because if they are not killed quickly they may become agitated and attack the user. The object is to kill all of the wasps or hornets in the nest quickly and completely. The ingredients in aerosol Wasp or Hornet Insecticide products are similar to crawling bug insecticides. However, aerosol Wasp or Hornet Insecticide products have unique propellant and aerosol hardware systems to produce a jet-type spray that reaches from ten to over twenty feet. This allows the user to spray the insecticide into inaccessible nests located in areas such as rooftops or trees. Products available can deliver the insecticides with a 22 foot foam blast. This allows users to stand back and "lock" the wasps or hornets inside their nest with a blanket of foam. It is recommended that users wear protective clothing and attempt to eradicate wasps or hornets in early morning or late afternoon/evening when the insects are at rest (ARB, 1997b; CSPA, 2010a; Claire, 2010).

Product Formulation:

Pesticide products contain both "active" and "inert" ingredients. The terms "active ingredient" and "inert ingredient" have been defined by FIFRA since 1947. The U.S. EPA defines an active ingredient as one that prevents, destroys, repels or mitigates a pest, or is a plant regulator, defoliant, desiccant or nitrogen stabilizer. By law, the name and percentage of the active ingredient must be identified and displayed on the product label.

An inert ingredient is defined by U.S. EPA as any substance (or group of structurally similar substances if designated by U.S. EPA), other than an active ingredient, which is intentionally included in a pesticide product. Inert ingredients play a key role in the effectiveness of a pesticide product. For example, inert ingredients may serve as a solvent, allowing the pesticide's active ingredient to be delivered to the target pest. In some instances, inert ingredients are added to extend the pesticide product's shelf-life or to protect the pesticide from degradation due to exposure to sunlight. Pesticide products can contain more than one inert ingredient, but federal law does not require

that these ingredients be identified by name or percentage on the label. Only the total percentage of inert ingredients is required to be on the pesticide product label (U.S. EPA, 2003b; U.S. EPA, 2010a).

In this rulemaking, our proposal does not directly affect the active ingredients to be used. The proposal is intended to only affect the use of inert ingredients that are VOCs and compounds with higher GWP values in Wasp or Hornet Insecticide products.

Active Ingredients:

As shown on product labels, the active ingredients make up only a small portion of Wasp or Hornet Insecticide product formulations. Typically about 1 percent by weight of active ingredients is used. Based on data from the 2006 Survey, the active ingredients found in Wasp or Hornet Insecticide products are pyrethroids and the synergists piperonyl butoxide, and N-octyl bicycloheptene dicarboximide (MGK-264). According to U.S. EPA, the synergists have no pesticidal effects of their own but enhance the effectiveness of pyrethrins and pyrethroids (U.S. EPA, 2010b).

Inert Ingredients:

The bulk of the Wasp or Hornet Insecticide product formulation consists of the inert ingredients, such as propellants, solvents, and co-solvents. The propellants are typically hydrocarbon blends or compressed gases such as carbon dioxide (CO₂). Solvents and co-solvents include VOC and LVP-VOC petroleum distillates, water, emulsifiers, surfactants, or corrosion inhibitors (ARB, 2007e; ARB, 1997b; AgrEvo, 2010).

Emulsifiers, surfactants, and corrosion inhibitors are typically present in small amounts in the product formulation. Some inert ingredients are used to solubilize the actives, and aid the mixing of actives to create a homogeneous liquid that can be sprayed. Solvents and co-solvents may be used to increase the vapor pressure in a product, and, along with the aerosol container, valve, and nozzle, to control spray pattern.

The most frequently used inert ingredients reported in the 2006 Survey include water, mineral spirits, propane, propylene glycol n-butyl ether, n-butane, petroleum distillates and synthetic paraffinic hydrocarbons. LVP-VOC glycols, such as dipropylene glycol and propylene glycol, were also reported in the 2006 Survey for some of the Wasp or Hornet Insecticides products. The majority of the products did not report the use of fragrance mixtures.

Propellants:

Propellant blends used vary depending on the formulation. According to the 2006 Survey, propellant content in Wasp or Hornet Insecticide products ranged from 1 percent to about 10 percent of product weight. The propellants used include hydrocarbon blends of n-butane, iso-butane, and propane. Over 70 percent of the

product formulations reported the use of CO₂. No VOC exempt propellants were reported.

Proposed VOC Limit and Compliance:

The proposed VOC limit for aerosol Wasp or Hornet Insecticide products is 10 percent by weight, effective December 31, 2013. As shown in Table VII-22, the proposed 10 percent by weight VOC would result in emission reductions of 286 pounds per day, or about 0.14 tons per day, statewide in 2014. The emission reduction is estimated for 2014 because products requiring FIFRA registration are given an extra year, as specified in section 94509(d), from the proposed effective date to comply. This reduction, although important to overall air quality, will not occur within the timeframe to be credited toward the current SIP commitment.

Table VII-22
Wasp or Hornet Insecticide Proposal

Product Form	Proposed VOC Limit (weight percent)	Number of Complying Products	Complying Market Share (percent)	2014 Emissions Reductions (pounds per day)
Aerosol	10	38	60	286

As shown in Table VII-22, 38 products reflecting 60 percent of the market for aerosol Wasp or Hornet Insecticide products already comply with the proposed 10 percent by weight VOC limit. This indicates that further reductions can be achieved from this category and that the proposed VOC limit is both technologically and commercially feasible.

Compliance with the proposed 10 percent by weight VOC limit is expected to be accomplished by reformulating products with up to 10 percent VOC solvent or VOC propellant along with VOC and LVP-VOC solvent mixtures, water, or non-VOC propellant. These technologies are currently available and widely accepted in both the household and institutional markets as shown by the 2006 Survey. In addition, the 2006 Survey indicates that companies will be able to maintain their dielectric strength and knockdown capabilities using an LVP-VOC only solvent system.

Proposed GWP Limit:

No solvents or propellants with high GWP values were reported in the Wasp or Hornet Insecticide category surveyed in 2006. However, to ensure that use of compounds with higher GWP values does not begin as products reformulate to comply with the proposed 10 percent by weight VOC limit, we are proposing a GWP limit of 150 for any chemical compound used in aerosol Wasp or Hornet Insecticide products, effective December 31, 2013. While this proposal would allow use of the non-VOC propellant, HFC-152a, we believe other reformulation options are more likely. The proposed limit would not apply to any chemicals present as contaminants, which in aggregate are

0.1 percent by weight or less. This limit is proposed as a mitigation measure under CEQA (see Chapter IX, Environmental Impacts, section E). The proposed limit is contained in section 94509(n).

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Chapter VIII. Economic Impacts

This chapter provides our analysis of the estimated economic and fiscal impacts of the proposed amendments. The analysis focuses on costs to comply with the proposed volatile organic compound (VOC) limits. We expect the other proposals such as mitigation measures to prohibit use of certain toxic air contaminants, limit the use of greenhouse gases with high global warming potential values, and preclude use of alkylphenol surfactants to result in negligible or no costs. Proposed amendments to Test Method 310 will have no economic or fiscal impact. Businesses that manufacture products with VOC contents above the proposed VOC limits would incur costs to reformulate their products. Potential fiscal impacts would be costs incurred by State agencies to administer, enforce, or comply with the proposal.

Economic impact analyses are imprecise, given the unpredictable behavior of companies in a highly competitive market such as consumer products. While staff has quantified the economic impacts to the extent feasible, some projections are necessarily qualitative, and based on general observations and facts known about the consumer products industry. This analysis, therefore, serves to provide a general picture of the economic impacts typical businesses might encounter. Individual companies may experience different impacts than projected.

The summary of economic and fiscal impacts of the proposed VOC limits is presented in section A. The other sections provide the step-by-step details of how we determined the compliance costs and potential impacts. Section F contains information on alternative means of compliance.

This economic impacts analysis was conducted in accordance with the current legal requirements under the Administrative Procedure Act (APA). This analysis uses similar methodologies and assumptions as were used in the 2009 consumer products rulemaking (ARB, 2009c).

A. Summary of Economic Impacts

Staff has estimated that the overall cost to comply with the proposed VOC limits is about \$5 million per year for ten years (just under \$50 million in total). This amount includes both recurring (*e.g.*, raw materials) and nonrecurring (*e.g.*, research and development) costs and is estimated based on assumptions specific to each category.

The cost represents the average of low and high cost estimates and is staff's prediction of the costs businesses would most likely incur.

Another measure of the economic impacts of the proposal is to determine the "dollars to be spent per pound of VOC reduced," or cost-effectiveness (CE). The CE of the proposed amendments has been calculated to be about \$0.98 per pound of VOC reduced. This is based on expected emission reductions of about 6.9 tons per day. The CE of other recent consumer products rulemakings has ranged from about \$0.30 to about \$6.25. Based on this range, staff believes the proposed amendments are cost effective.

The impacts of the proposed amendments on manufacturers are estimated by determining the "return on owner's equity" (ROE). In the ROE analysis we compare a company's percentage reduction in profitability before and after incurring the costs associated with the proposed amendments. The analysis found that the overall reduction in profitability ranges from about 1 percent to about 3 percent. The overall average decline in ROE is about 1.6 percent. To the extent that the projected costs are passed on to consumers, the impact on business profitability is likely to be much less than estimated in our projection.

Because we expect some businesses will pass on at least a portion of their compliance costs to the consumer, we estimated the increased cost the consumer may experience. If all assumed compliance costs are passed on to the consumer, without consideration of typical retail mark-up, we estimate the cost per unit increase would range from negligible cost (net savings or no cost) for a nonaerosol General Purpose Cleaner product to about \$0.44 for a Heavy-duty Hand Cleaner or Soap product. When considering normal retail mark-up of 100 percent, increased cost to the consumer to purchase a Heavy-duty Hand Cleaner or Soap product would increase by about \$0.90 per gallon.

Based on our ROE calculations, we believe that overall, most affected businesses will be able to absorb the costs, or will pass through some of the costs to the consumer, such that there will be no significant adverse impacts on their profitability. Therefore, we do not expect a noticeable change in employment; business creation, elimination or expansion; or business competitiveness in California. However, the proposed amendments may impose economic hardship on some businesses with very little or no margin of profitability.

We determined that there would be no significant adverse fiscal impacts to any local or State agencies. While not significant, ARB will have costs in the future to enforce the new limits proposed here.

Staff believes that the regulation cost and CE determination methodologies are conservative. For example, the average cost scenario of low and high determines the overall cost and CE of the regulation. The low cost scenario assumes that companies would choose the lowest cost reformulation pathway, making minor adjustments to a

product's formulation, or simply ceasing sale of some noncomplying products. We believe that most manufacturers would choose the lowest cost reformulation option. For the high cost scenario, it is assumed that there is significant research and development, and new equipment is needed to reformulate the product. We believe that few manufacturers would need to take the high cost reformulation approach.

Details of our cost analysis are in the following sections. Additional information as to how recurring and nonrecurring costs were estimated is contained in Appendices D and E.

B. Costs of Compliance

To determine the total cost to comply with the proposal, recurring and nonrecurring costs are estimated. These estimates are representative of the costs expended to reformulate and bring a product to market. Recurring costs for this analysis are those associated with the cost of the raw materials. Nonrecurring costs are assumed to be one time costs and are those associated with research, development, and plant changes that may be necessary to develop a reformulated complying product. Our analysis further assumes that nonrecurring costs will be amortized over a project horizon of ten years. Summing the recurring and amortized nonrecurring costs represents the total cost to reformulate a product. We then use the total cost to estimate the potential cost per unit increase to the consumer, the CE of the proposed amendments, and the ROE.

There are many variables in producing a product for market, and assumptions about those variables will greatly affect the outcome of any cost analysis. For each assumption, staff applied a test of "reasonableness" to determine if this was a likely approach to take, or if the event had a high probability of occurring. The following sections describe our process for arriving at the costs to comply with the proposed amendments.

1. Recurring Costs

As part of the economic impact analysis, we evaluated the expected cost impacts from complying with the proposed VOC limits on raw material costs. The change in the cost of raw material costs are expected to be ongoing, *i.e.*, they are recurring costs.

a. Methodology

Using the data from the 2006 Survey and the 2008 Survey Update staff determined the formulations which most closely reflect the "typical" formulations for compliant and noncompliant products in each category. For each category staff estimated a "low cost" and "high cost" by varying costs for ingredients. Information on how raw material costs were estimated, as well as formulations evaluated (with individual weight fractions and unit prices per pound), are shown in Appendix D. While these formulations may not reflect the exact composition of existing noncompliant products and compliant products

that will be marketed, we believe they are reasonably representative for the purposes of this analysis.

Except for ingredient costs, we assumed changes in packaging, delivery systems, labeling, distribution and other recurring costs would be negligible relative to baseline levels of these costs (ARB, 1997b). We believe this assumption is valid because the proposed limits should not require significant packaging or delivery system modifications. We also believe distribution costs would be the same because we do not expect manufacturers to sell and distribute “California only products.” The most likely pathway for reformulation was assumed for noncompliant products. Despite this assumption, alternative formulations may allow lower-cost compliant products than shown in our analysis.

b. Results

The estimated cost of typical noncompliant and compliant formulations for each category is displayed in Table VIII-1a. The values in columns A and B are taken from Appendix D. The difference between high and low cost of noncompliant and compliant formulations yields the change in ingredient costs. As shown in Table VIII-1a, Columns C₁ and C₂, the anticipated raw materials cost change ranges from no cost (net savings or no cost) for a 23 ounce General Purpose Degreaser (nonaerosol) product to about \$0.64 increase per unit for a 133 ounce Heavy-duty Hand Cleaner or Soap. In instances when the cost for raw materials in the predicted reformulated product are comparable or slightly cheaper to those currently used, rather than assigning a negative cost, we assume there will be no change in the cost of raw materials.

Using the change in the cost per unit from Table VIII-1a, the total recurring costs per category are calculated as shown in Table VIII-1b. To arrive at the total cost per category, estimated noncompliant unit sales (Column D) are multiplied by the recurring costs per unit taken from Table VIII-1a, Columns C₁ and C₂. As shown in Table VIII-1b, Column E₃ the average total recurring cost per category ranges from no cost for several categories to about \$346,900 for the Heavy-duty Hand Cleaner or Soap products reformulated to comply with the 1 percent VOC limit.

2. Nonrecurring Costs

In this portion of the analysis, we evaluated the impacts of nonrecurring costs likely to be expended to comply with the proposed limits. These are assumed to be costs incurred once to conduct the necessary research and development to produce a complying product. Technical literature and industry trade journals provide little information to estimate nonrecurring costs directly. This is not surprising because the

Table VIII-1a
Estimated Change in Formula Cost per Unit*

Category	Formula Cost per Unit				Cost Increase to Comply per Unit Low High	
	Noncomplying Low High		Complying Low High			
	A ₁	A ₂	B ₁	B ₂	C ₁ = B ₁ – A ₁	C ₂ = B ₂ –A ₂
Furniture Maintenance Product (aerosol)	\$0.31	\$0.57	\$0.35	\$0.60	\$0.04 ⁺	\$0.04 ⁺
General Purpose Cleaner (nonaerosol)	\$0.19	\$0.25	\$0.13	\$0.17	\$0.00	\$0.00
General Purpose Degreaser (nonaerosol)	\$0.34	\$0.50	\$0.22	\$0.39	\$0.00	\$0.00
Glass Cleaner (nonaerosol)	\$0.07	\$0.10	\$0.06	\$0.08	\$0.00	\$0.00
Heavy-duty Hand Cleaner or Soap	\$4.76	\$8.30	\$4.99	\$8.93	\$0.23	\$0.64
Insecticide – Flying Bug (aerosol)	\$0.44	\$0.71	\$0.36	\$0.57	\$0.00	\$0.00
Insecticide – Wasp or Hornet (aerosol)	\$0.69	\$0.86	\$0.80	\$0.93	\$0.11	\$0.07
Lubricant – Special Purpose (aerosol)	\$0.52	\$0.72	\$0.51	\$0.71	\$0.00	\$0.00
Lubricant – Special Purpose (nonaerosol)	\$0.63	\$0.82	\$0.65	\$0.85	\$0.02	\$0.03
Oven or Grill Cleaner (aerosol)	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Oven or Grill Cleaner (nonaerosol)	\$3.65	\$4.26	\$2.07	\$3.67	\$0.00	\$0.00
Spot Remover – Dry Clean Only (aerosol)	\$0.93	\$1.36	\$0.79	\$1.14	\$0.00	\$0.00
Spot Remover – Dry Clean Only (nonaerosol)	\$1.44	\$1.81	\$1.35	\$1.78	\$0.00	\$0.00
Metal Polish or Cleanser (aerosol)	\$0.96	\$1.14	\$0.32	\$0.40	\$0.00	\$0.00
Metal Polish or Cleanser (nonaerosol)	\$1.07	\$1.25	\$0.41	\$0.46	\$0.00	\$0.00

* Raw material costs are assumed to be \$0.00 when staff estimates that materials used to reformulate are comparably priced to current materials or are less expensive than currently used.

+ Numbers have been rounded in tables, however unrounded numbers are used for calculations.

consumer products industry is competitive, and production cost data specific to a company are closely guarded trade secrets. Stakeholders have generally concurred that our assumptions for nonrecurring costs are reasonable. Appendix E displays the various phases of product development and the costs that are assigned to each phase.

Table VIII-1b
Total Estimated Recurring Cost

Category	Annual California Noncomplying Unit Sales*	Total Annual Recurring Cost per Category ⁺		
		LOW	HIGH	AVERAGE
	D	$E_1 = D \times C_1^{**}$	$E_2 = D \times C_2^{**}$	$E_3 = (E_1 + E_2) / 2$
Furniture Maintenance Product (aerosol)	5,205,245	\$218,236	\$185,053	\$201,645
General Purpose Cleaner (nonaerosol)	47,023,377	\$0.00	\$0.00	\$0.00
General Purpose Degreaser (nonaerosol)	2,114,007	\$0.00	\$0.00	\$0.00
Glass Cleaner (nonaerosol)	23,775,680	\$0.00	\$0.00	\$0.00
Heavy-duty Hand Cleaner or Soap (nonaerosol)	802,431	\$181,710	\$512,122	\$346,916
Insecticide – Flying Bug (aerosol)	1,022,141	\$0.00	\$0.00	\$0.00
Insecticide – Wasp or Hornet (aerosol)	1,024,272	\$110,237	\$67,218	\$88,728
Lubricant – Special Purpose (aerosol)	314,820	\$0.00	\$0.00	\$0.00
Lubricant – Special Purpose (nonaerosol)	310,193	\$4,715	\$10,258	\$7,487
Oven or Grill Cleaner (aerosol)	68,952	\$0.00	\$0.00	\$0.00
Oven or Grill Cleaner (nonaerosol)	12,406	\$0.00	\$0.00	\$0.00
Spot Remover – Dry Clean Only (aerosol)	***	\$0.00	\$0.00	\$0.00
Spot Remover – Dry Clean Only (nonaerosol)	159,754	\$0.00	\$0.00	\$0.00
Metal Polish or Cleanser (aerosol)	443,930	\$0.00	\$0.00	\$0.00
Metal Polish or Cleanser (nonaerosol)	422,410	\$0.00	\$0.00	\$0.00

* Assumes “typical” unit size as shown in Appendix D.

** C_1 and C_2 are from Table VIII-1a

+ Numbers have been rounded in tables, however unrounded numbers are used for calculations.

*** Data are confidential.

a. Methodology

To estimate nonrecurring costs, we used two approaches for each product category, one for low cost, and one for high cost, with a different set of assumptions for each approach. The categories proposed for regulation are considered “household care” or “pesticide and disinfectant” products.

Appendix E displays the various high and low nonrecurring costs for each of these sectors. For each category only new or additional costs were considered. Costs were not considered that would have been expected in the normal course of business if the regulation had not been in effect.

b. Results

Table VIII-2, Columns A₁ and A₂, display the results of our assessment of the nonrecurring costs to be incurred for each category. These costs are taken from Appendix E. Estimated nonrecurring costs for the low cost scenario range from about \$300 to \$11,600 per category. Note also that nonrecurring costs for the high cost scenario range from about \$4,900 to \$160,250 per category.

c. Amortizing Nonrecurring Costs

The next part of our analysis assumes that nonrecurring costs will not be incurred in a single year, but would instead be amortized over ten years. The nonrecurring costs shown in Columns A₁ and A₂ are amortized using the Capital Recovery Method. This is a standard methodology and it is recommended under guidelines issued by the California Environmental Protection Agency (Cal/EPA).

The equation below shows that the estimated total nonrecurring costs per product is multiplied by the Capital Recovery Factor (CRF) to convert these costs into equal annual payments over a project horizon (i.e., the projected useful life of the investment) at a discount rate.

$$\text{Annualized nonrecurring costs} = (\text{Nonrecurring Costs}) \times [i(1 + i)^n / ((1 + i)^n - 1)]$$

Where:

$i(1 + i)^n / ((1 + i)^n - 1)$	=	Capital Recovery Factor (CRF)
i	=	discount interest rate over project horizon, %
n	=	number of years in project horizon
Nonrecurring Costs	=	total nonrecurring cost per product

We assumed a project horizon of ten years, a commonly cited period for an investment's useful lifetime in the chemical processing industry. We also assumed a

Table VIII-2
Estimated Nonrecurring per Product Costs to Comply with the Proposed Limits

Category	Cost Per Product		Amortized Cost Per Product	
	Low A ₁	High A ₂	Low B ₁ = A ₁ X CRF*	High B ₂ = A ₂ X CRF*
Furniture Maintenance Product (aerosol)	\$11,638	\$43,570	\$1,894	\$7,091
General Purpose Cleaner (nonaerosol)	\$7,311	\$38,795	\$1,190	\$6,314
General Purpose Degreaser (nonaerosol)	\$7,311	\$28,350	\$1,190	\$4,614
Glass Cleaner (nonaerosol)	\$1,641	\$9,400	\$267	\$1,530
Heavy-duty Hand Cleaner or Soap (nonaerosol)	\$448	\$5,968	\$73	\$971
Insecticide – Flying Bug (aerosol)	\$1,641	\$56,402	\$267	\$9,179
Insecticide – Wasp or Hornet (aerosol)	\$298	\$140,855	\$48	\$22,924
Lubricant – Special Purpose (aerosol)	\$597	\$26,858	\$97	\$4,371
Lubricant – Special Purpose (nonaerosol)	\$6,118	\$27,902	\$996	\$4,541
Oven or Grill Cleaner (aerosol)	\$5,670	\$19,696	\$923	\$3,205
Oven or Grill Cleaner (nonaerosol)	\$5,670	\$19,696	\$923	\$3,205
Spot Remover – Dry Clean Only (aerosol)	\$3,432	\$160,253	\$559	\$26,080
Spot Remover – Dry Clean Only (nonaerosol)	\$1,940	\$119,369	\$316	\$19,427
Metal Polish or Cleanser (aerosol)	\$746	\$4,924	\$121	\$801
Metal Polish or Cleanser (nonaerosol)	\$746	\$4,924	\$121	\$801

*CRF = Capital Recovery Factor of 0.16275

fixed interest rate of 10 percent throughout the project horizon. These assumptions are conservative and constitute standard practice in analyses of consumer products regulations, including previous consumer product rulemakings. Based on these assumptions, the Capital Recovery Factor (CRF), as shown below, is 0.16275.

$$\begin{aligned}
 \text{CRF} &= 0.1(1+0.1)^{10}/((1+0.1)^{10}-1) \\
 &= 0.1(2.59)/1.59 \\
 &= 0.259/1.59 \\
 &= 0.163 \text{ (rounded)}
 \end{aligned}$$

Using the low cost estimate for Furniture Maintenance Product (aerosol) from Table VIII-2, Column A₁, then the amortized cost is:

$$\text{Amortized Cost: } \$11,638 \times 0.16275 = \$1,894$$

For the low cost scenario, as shown in Column B₁, of Table VIII-2, we project per-product annualized nonrecurring costs to be about \$50 to \$1,900 for each of ten years. For the high cost scenario (Column B₂), we project per-product annualized nonrecurring costs to range from about \$800 to \$26,000 for each of ten years.

Next, nonrecurring costs for all noncomplying products per category are calculated by using the low and high amortized costs from Table VIII-2, Columns B₁ and B₂. To arrive at the range of total nonrecurring cost per category, two different scenarios are calculated. In the low cost scenario, we assume that manufacturers will conduct research and other product development once for a given product category, and use these efforts as a basis to reformulate all their other noncomplying products in the same category. As shown in Table VIII-3, the low cost incurred by all businesses is the product of the low product cost (Column C) and number of companies (Column B) that have noncomplying products within the given category.

In the total nonrecurring high cost scenario, we assume that reformulation costs would be incurred per product. This means that companies that have multiple noncomplying products in a given category would conduct separate research and development efforts for each product in their respective product lines. Thus in this case, the high amortized cost (Column D) is multiplied by the number of noncomplying products (Column A).

As shown in Table VIII-3, total category annualized nonrecurring costs for the low cost scenario range from about \$560 for a Spot Remover (Dry Clean Only) (aerosol) product to \$161,800 for a General Purpose Cleaner (nonaerosol) product. For the high cost scenario, costs range from \$9,600 for an Oven or Grill Cleaner (aerosol) product to \$3,775,600 for a General Purpose Cleaner (nonaerosol) product. The high cost scenario for a General Purpose Cleaner (nonaerosol) product is overestimated. This is because to calculate this cost we assumed that all General Purpose Cleaner (nonaerosol) products would incur the costs for the registration required by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). In reality only about 5 percent of products are currently registered as FIFRA products. Therefore, this cost estimate is conservative. Also as shown in Table VIII-3, the total nonrecurring cost to industry is projected to range from about \$389,200 to just over \$8,217,300 dollars per year for ten years.

3. Total Costs

For each category, the total cost of reformulation is estimated by summing recurring costs (see Table VIII-1b, Columns E₁ and E₂) with nonrecurring amortized costs (see Table VIII-3, Columns E₁ and E₂). Table VIII-4 displays the total low and high cost to

Table VIII-3
Estimated Total Nonrecurring Cost per Category

Category	# Non-complying Products*	# Companies	Low Cost/Product	High Cost/Product	Total Nonrecurring Cost per Category	
	A	B	C	D	E ₁ = B X C	E ₂ = D X A
Furniture Maintenance Product (aerosol)	56	30	\$1,894	\$7,091	\$56,821	\$397,086
General Purpose Cleaner (nonaerosol)	598	136	\$1,190	\$6,314	\$161,817	\$3,775,597
General Purpose Degreaser (nonaerosol)	257	82	\$1,190	\$4,614	\$97,566	\$1,185,755
Glass Cleaner (nonaerosol)	148	80	\$267	\$1,530	\$21,365	\$226,411
Heavy-duty Hand Cleaner or Soap (nonaerosol)	161	51	\$73	\$971	\$3,718	\$156,374
Insecticide – Flying Bug (aerosol)	37	23	\$267	\$9,179	\$6,142	\$339,629
Insecticide – Wasp or Hornet (aerosol)	20	14	\$48	\$22,924	\$679	\$458,470
Lubricant – Special Purpose (aerosol)	118	43	\$97	\$4,371	\$4,178	\$515,780
Lubricant – Special Purpose (nonaerosol)	66	18	\$996	\$4,541	\$17,922	\$299,701
Oven or Grill Cleaner (aerosol)	3	3	\$923	\$3,205	\$2,768	\$9,616
Oven or Grill Cleaner (nonaerosol)	9	5	\$923	\$3,205	\$4,614	\$28,849
Spot Remover – Dry Clean Only (aerosol)	1	1	\$559	\$26,080	\$559	\$26,080
Spot Remover – Dry Clean Only (nonaerosol)	36	5	\$316	\$19,427	\$1,579	\$699,363
Metal Polish or Cleanser (aerosol)	59	37	\$121	\$801	\$4,492	\$47,280
Metal Polish or Cleanser (nonaerosol)	64	41	\$121	\$801	\$4,978	\$51,287
Total:	1,633				\$389,198	\$8,217,278

* Adjusted for market covered in survey. Assume 90% market coverage for all categories.

reformulate all noncomplying products for each category. As shown in Table VIII-4, Column C₁, we estimate the low per year industry compliance costs to range from a low of about \$560 for Spot Remover (Dry Clean Only) (aerosol) products, to a high of about \$275,000 for a Furniture Maintenance Product (aerosol) product. We estimate the high per year industry compliance costs to range from a low of about \$9,600 for Oven or Grill Cleaner (aerosol) products, to a high of about \$3,775,600 for General Purpose Cleaner (nonaerosol) products. Again, this cost for General Purpose Cleaner (nonaerosol) products is conservative based on the assumption that all products would incur the costs of FIFRA registration. Table VIII-4 (Column C₃) also shows the average cost estimates to range from about \$6,200 for Oven or Grill Cleaner (aerosol) products to \$1,968,700 for General Purpose Cleaner (nonaerosol) products (Column C₂). As shown in Column C₃, the overall average cost to reformulate all noncomplying products for all categories is just under \$5 million.

4. Cost per Unit

We also evaluated the potential increased cost the consumer would pay if all costs of compliance were passed onto the consumer (not including retail mark-up). For this estimate, we assumed that all recurring and nonrecurring costs are assessed only to the number of noncomplying units in each category. Tables VIII-5a and VIII-5b display the result of this analysis.

For this rulemaking, as with others, we assumed products reformulated to meet the proposed limits will be marketed throughout the United States by national marketers. From our experience, we know that businesses generally formulate and distribute to the entire nation, products complying with California regulations, rather than incurring the additional cost of setting up a California specific product distribution system. This assumption is valid especially considering the number of jurisdictions that have, and are continuing to adopt California standards.

Therefore, we assume that the costs of compliance will not be assessed only to products sold in California, but will be spread over products sold across the country. To do this, our analysis used the California-apportioned (by population) high and low nonrecurring costs (Table VIII-3). Using this alternative approach, we discounted the nonrecurring cost per unit by the California-apportionment factor (*i.e.*, the current ratio of California to U.S. population, or 12.0 percent (U.S. Census, 2010)). To illustrate, using the total nonrecurring high cost for Special Purpose Lubricant (nonaerosol) products of \$299,701 the nonrecurring portion of cost that would be passed onto California consumers is 12 percent of this amount, or about \$36,000. The California portion of low and high nonrecurring costs (Table VIII-3, Columns E₁ and E₂) are each divided by the number of noncomplying units sold in California per year (see column A of Table VIII-5b). The resulting nonrecurring high and low cost per unit is then added to the recurring high and low cost per unit (taken from Table VIII-1a, Columns C₁ and C₂) to arrive at the total increase in cost per unit to the consumer.

Table VIII-4
Estimated Total Costs to Comply with the Proposed VOC Limits

	Nonrecurring Costs		Recurring Costs*	
	Low	High	Low	High
	A ₁	A ₂	B ₁	B ₂
Furniture Maintenance Product (aerosol)	\$56,821	\$397,086	\$218,236	\$185,053
General Purpose Cleaner (nonaerosol)	\$161,817	\$3,775,597	\$0.00	\$0.00
General Purpose Degreaser (nonaerosol)	\$97,566	\$1,185,755	\$0.00	\$0.00
Glass Cleaner (nonaerosol)	\$21,365	\$226,411	\$0.00	\$0.00
Heavy-duty Hand Cleaner or Soap	\$3,718	\$156,374	\$181,710	\$512,122
Insecticide – Flying Bug (aerosol)	\$6,142	\$339,629	\$0.00	\$0.00
Insecticide – Wasp or Hornet (aerosol)	\$679	\$458,470	\$110,237	\$67,218
Lubricant – Special Purpose (aerosol)	\$4,178	\$515,780	\$0.00	\$0.00
Lubricant – Special Purpose (nonaerosol)	\$17,922	\$299,701	\$4,715	\$10,258
Oven or Grill Cleaner (aerosol)	\$2,768	\$9,616	\$0.00	\$0.00
Oven or Grill Cleaner (nonaerosol)	\$4,614	\$28,849	\$0.00	\$0.00
Spot Remover – Dry Clean Only (aerosol)	\$559	\$26,080	\$0.00	\$0.00
Spot Remover – Dry Clean Only (nonaerosol)	\$1,579	\$699,363	\$0.00	\$0.00
Metal Polish or Cleanser (aerosol)	\$4,492	\$47,280	\$0.00	\$0.00
Metal Polish or Cleanser (nonaerosol)	\$4,978	\$51,287	\$0.00	\$0.00
	Nonrecurring and Recurring Costs*			
	Low	High	Average	
	C ₁ = A ₁ + B ₁	C ₂ = A ₂ + B ₂	C ₃ = (C ₁ + C ₂)/2	
Furniture Maintenance Product (aerosol)	\$275,057	\$582,139	\$428,598	
General Purpose Cleaner (nonaerosol)	\$161,817	\$3,775,597	\$1,968,707	
General Purpose Degreaser (nonaerosol)	\$97,566	\$1,185,755	\$641,660	
Glass Cleaner (nonaerosol)	\$21,365	\$226,411	\$123,888	
Heavy-duty Hand Cleaner or Soap (nonaerosol)	\$185,428	\$668,496	\$426,962	
Insecticide – Flying Bug (aerosol)	\$6,142	\$339,629	\$172,886	
Insecticide – Wasp or Hornet (aerosol)	\$110,916	\$525,688	\$318,302	
Lubricant – Special Purpose (aerosol)	\$4,178	\$515,780	\$259,979	
Lubricant – Special Purpose (nonaerosol)	\$22,637	\$309,959	\$166,298	
Oven or Grill Cleaner (aerosol)	\$2,768	\$9,616	\$6,192	
Oven or Grill Cleaner (nonaerosol)	\$4,614	\$28,849	\$16,731	
Spot Remover – Dry Clean Only (aerosol)	\$559	\$26,080	\$13,319	
Spot Remover – Dry Clean Only (nonaerosol)	\$1,579	\$699,363	\$350,471	
Metal Polish or Cleanser (aerosol)	\$4,492	\$47,280	\$25,886	
Metal Polish or Cleanser (nonaerosol)	\$4,978	\$51,287	\$28,132	
TOTAL:	\$904,097	\$8,991,929	\$4,948,013	

* A cost of \$0 may indicate a per unit cost of less than one-half of one cent.

+ Numbers have been rounded in tables, however unrounded numbers are used for calculations.

Table VIII-5a
Estimated Per-Unit Cost Increases from Annualized Nonrecurring and Annual
Recurring Costs*

	Annual California Noncomplying Unit Sales	Annualized Nonrecurring Low Cost/Unit***	Annualized Nonrecurring High Cost/Unit	Annual Recurring Low Cost/Unit ^z	Annual Recurring High Cost/Unit ^z
Category	A	B ₁	B ₂	C ₁	C ₂
Furniture Maintenance Product (aerosol)	5,205,245	\$0.00	\$0.01	\$0.04	\$0.04
General Purpose Cleaner (nonaerosol)	47,023,377	\$0.00	\$0.01	\$0.00	\$0.00
General Purpose Degreaser (nonaerosol)	2,114,007	\$0.01	\$0.07	\$0.00	\$0.00
Glass Cleaner (nonaerosol)	23,775,680	\$0.00	\$0.00	\$0.00	\$0.00
Heavy-duty Hand Cleaner or Soap (nonaerosol)	802,431	\$0.00	\$0.02	\$0.23	\$0.64
Insecticide – Flying Bug (aerosol)	1,022,141	\$0.00	\$0.04	\$0.00	\$0.00
Insecticide – Wasp or Hornet (aerosol)	1,024,272	\$0.00	\$0.05	\$0.11	\$0.07
Lubricant – Special Purpose (aerosol)	314,820	\$0.00	\$0.20	\$0.00	\$0.00
Lubricant – Special Purpose (nonaerosol)	310,193	\$0.01	\$0.12	\$0.02	\$0.03
Oven or Grill Cleaner (aerosol)	68,952	\$0.00	\$0.02	\$0.00	\$0.00
Oven or Grill Cleaner (nonaerosol)	12,406	\$0.04	\$0.28	\$0.00	\$0.00
Spot Remover – Dry Clean Only (aerosol)	175,200	\$0.00	\$0.02	\$0.00	\$0.00
Spot Remover – Dry Clean Only (nonaerosol)	159,754	\$0.00	\$0.53	\$0.00	\$0.00
Metal Polish or Cleanser (aerosol)	443,930	\$0.00	\$0.01	\$0.00	\$0.00
Metal Polish or Cleanser (nonaerosol)	422,410	\$0.00	\$0.01	\$0.00	\$0.00

* Numbers have been rounded in tables, however unrounded numbers are used for calculations.

+ A cost of \$0 may indicate a per unit cost of less than one-half of one cent.

** Costs in Columns B₁ and B₂ arrived at by apportioning nonrecurring total costs from Table VIII-3, Columns E₁ and E₂, by the percentage of California population (12%).

^z Costs are from Table VIII-1a, Columns C₁ and C₂.

Table VIII-5b
Sum of Estimated Per-Unit Cost Increases from Both Annualized Nonrecurring
and Annual Recurring Costs

	Total Increase Low/Unit**	Total Increase High/Unit	Total Increase Mid/Unit
Category	D ₁	D ₂	D ₃
Furniture Maintenance Product (aerosol)	\$0.04	\$0.04	\$0.04
General Purpose Cleaner (nonaerosol)	\$0.00	\$0.01	\$0.01
General Purpose Degreaser (nonaerosol)	\$0.01	\$0.07	\$0.04
Glass Cleaner (nonaerosol)	\$0.00	\$0.00	\$0.00
Heavy-duty Hand Cleaner or Soap (nonaerosol)	\$0.23	\$0.66	\$0.44
Insecticide – Flying Bug (aerosol)	\$0.00	\$0.04	\$0.02
Insecticide – Wasp or Hornet (aerosol)	\$0.11	\$0.12	\$0.11
Lubricant – Special Purpose (aerosol)	\$0.00	\$0.20	\$0.10
Lubricant – Special Purpose (nonaerosol)	\$0.02	\$0.15	\$0.09
Oven or Grill Cleaner (aerosol)	\$0.00	\$0.02	\$0.01
Oven or Grill Cleaner (nonaerosol)	\$0.04	\$0.28	\$0.16
Spot Remover – Dry Clean Only (aerosol)	\$0.00	\$0.02	\$0.01
Spot Remover – Dry Clean Only (nonaerosol)	\$0.00	\$0.53	\$0.26
Metal Polish or Cleanser (aerosol)	\$0.00	\$0.01	\$0.01
Metal Polish or Cleanser (nonaerosol)	\$0.00	\$0.01	\$0.01

* A cost of \$0 may indicate a per unit cost of less than one-half of one cent.

* Numbers have been rounded in tables, however unrounded numbers are used for calculations.

For most products the total cost of reformulating products is estimated to be quite minimal. The recurring raw materials costs to reformulate a number of products to meet the proposed VOC limits are projected to be zero. This is because the costs of ingredients of a complying product are actually less than the cost of ingredients of a noncomplying product. For the purposes of our cost calculations, in this case, as was done in economic analyses for previous rulemakings, we assume that the ingredient costs are zero. As for the nonrecurring costs (research and development), while these costs are significant, once the costs are spread over the number of units sold, the resulting overall cost per unit is negligible.

As shown in Table VIII-5b, we estimate the average cost per unit increase to the California consumer to range from no cost increase to about \$0.44. The worst case scenario cost increase would be about \$0.66 for Heavy-duty Hand Cleaner or Soap products. This cost does not reflect typical retail mark-up. Because of unpredictable factors such as the highly competitive nature of the consumer products market, it is not possible to accurately predict the final retail price of products that will comply with the proposed limits when they become effective. To the extent the cost impacts are passed on to consumers, the final retail prices may be lower or higher than suggested by this analysis.

5. Cost-effectiveness (CE)

Using the total costs displayed in Table VIII-4, we evaluated the anticipated CE of the proposed new limits. Such an evaluation allows us to compare the efficiency of the proposed limits in reducing a pound of VOC relative to other existing regulatory programs.

The CE of a reduction strategy is generally defined as the ratio of total dollars to be spent to comply with the strategy (as an annual cost) to the mass reduction of the pollutant(s) to be achieved by complying with that strategy (in annual pounds). The CE is calculated as shown by the following general equation:

$$\text{Cost-effectiveness} = \frac{\text{Total Annual Cost to Comply}}{\text{Annual Mass Reduction in VOC}}$$

We estimate that, when fully effective, the proposed VOC limits will result in an emission reduction of about 6.9 tons per day, or 5,037,000 pounds per year. In this chapter, we have calculated that the average total annual cost to comply with the proposed VOC limits is \$4,948,013.

The CE of the proposed amendments related to complying with the VOC limits is about \$0.98 per pound of VOC reduced, as shown by the following equation:

$$\frac{\$4,948,013}{5,037,000} = \$0.98 \text{ per pound}$$

Table VIII-6 shows a comparison of the CE for the proposed limits relative to other recent ARB consumer product regulations and control measures.

Table VIII-6
Comparison of Cost-Effectiveness for ARB Consumer Product Regulations/Measures

Regulation/Control Measure	Cost-Effectiveness (Dollars per Pound VOC Reduced)
2010 Amendments	\$0.98
2009 Amendments (ARB, 2009c)	\$0.29
2008 Amendments (ARB, 2008a)	\$6.23
2006 Amendments (ARB, 2006a)	\$2.35

As shown in Table VIII-6, the CE compares favorably with other recent rulemakings.

C. Return on Owners' Equity

Typical California businesses are affected by the proposed new limits to the extent that the implementation of these requirements would change their profitability. To estimate reduction in profitability, this portion of the economic impacts analysis compares the Return on Owners' Equity (ROE) for affected businesses before and after inclusion of the cost to comply with the proposed requirements. The data used in this analysis are obtained from Dun and Bradstreet Industry Norms and Key Business Ratio (D&B, 2008; D&B, 2009), the ARB's 2006 Consumer and Commercial Products Survey (ARB, 2007e), the Survey Update for Dry Clean Only Spot Remover products (ARB, 2009e), and the CE analysis described previously in section B.

1. Affected Businesses

Any business which manufactures or markets consumer products subject to the proposed new limits and requirements can be directly affected by this regulation. Also potentially affected are businesses which supply raw materials or equipment to manufacturers or marketers, and those that distribute or sell consumer products in California. The focus of this analysis, however, will be on manufacturers, marketers, and distributors that are most affected by the proposed measures.

The consumer products subject to the proposed measures are manufactured, marketed, or distributed by a large number of companies worldwide. According to our Surveys, there are about 244 companies that market the affected products in California. Many of these companies manufacture, market, and distribute a broad range of solvent, adhesive, household, and personal care products. All together, there are about 1,633 noncomplying products (based on reported figures). Of the companies manufacturing these products, 29 small-sized firms are located in California.

These 244 companies can be described by the North American Industry Classification System codes (NAICS): 325611, Soap and Other Detergent Manufacturing; 325612, Polish and Other Sanitation Goods manufacturing; 325320, Pesticides and Agricultural Chemicals; and 324191, Lubricant manufacturing.

2. Analysis Approach

This analysis covers 4 industries with at least 244 affected businesses. The approach used in evaluating the potential economic impact of the proposed measures on these businesses is as follows:

- (1) A typical business from each product category was selected from the respondents to the surveys.
- (2) A range of compliance costs were estimated for each affected product category. The average cost (see Table VIII-4) for each category was used in this analysis.

- (3) Compliance cost to a typical business was then estimated based on a weighted average of all product category costs in the affected industry.
- (4) Estimated cost was adjusted for federal and State taxes.
- (5) The ROE was calculated for each of these businesses by dividing the net profit by the net worth. The adjusted cost was then subtracted from net profit data. The results were used to calculate an adjusted ROE.
- (6) The adjusted ROE was then compared with the ROE before the subtraction of the cost to determine the potential impact on the profitability of the business.

An ROE reduction of more than 10 percent in profitability assuming that all costs are absorbed by the affected company and not passed on to the consumer, is considered to indicate a potential for significant adverse economic impacts. This value has been used consistently by the ARB staff to determine impact severity and is consistent with that used by the U.S. EPA.

3. Assumptions

This analysis uses 2006-2008 Dun and Bradstreet financial data (D&B, 2009) for a nationwide typical businesses in the Polish and Other Sanitation Good Manufacturing industry (325612 NAICS code); Pesticides and Agricultural Chemicals (325320 NAICS code); and Lubricant manufacturing (324191 NAICS code). For Soap and Other Detergent Manufacturing (NAICS code 325611) 2005-2007 Dun and Bradstreet financial data (D&B, 2008) were used due to lack of 2008 data. These data were used to calculate the ROEs before and after the subtraction of the compliance costs for a typical business. The calculations were based on the following assumptions:

- (1) A typical business on a nationwide basis in each industry is representative of a typical California business in that industry;
- (2) All affected businesses were subject to federal and State tax rates of 35 percent and 9.3 percent respectively; and
- (3) Affected businesses are neither able to increase the prices of their products, nor can they lower their costs of doing business through short-term cost-cutting measures.

Given the limitation of available data, we believe these assumptions are reasonable for most businesses at least in the short run; however, they may not be applicable to all businesses.

4. Results

Table VIII-7 shows the results of our analysis of ROE. The percentage reduction in profitability ranges from less than 1 percent for Polish and Other Sanitation Good Manufacturing to less than 3 percent for Soap and Other Detergent Manufacturing. The mean percentage reduction in profitability is 1.6 percent.

Table VIII-7
Summary of Decline in Return on Owners' Equity (ROE)

NAICS	Industry	Percent Reduction in ROE
325611	Soap and Other Detergent Manufacturing	2.9
325612	Polish & Other Sanitation Good Manufacturing	0.8
325320	Pesticides and Agricultural Chemicals	1.6
324191	Lubricant Manufacturing	1.1
Average		1.6

Based on the estimated ROEs, we believe that overall, most affected businesses will be able to absorb the costs with no significant adverse impacts on their profitability. To the extent that at least some of the estimated costs are passed on to consumers, the impact on businesses' profitability will be less than estimated here. However, the proposed amendments may impose economic hardship on some businesses with very little or no margin of profitability.

D. Impacts on California Businesses, Consumers, and State and Local Agencies

Section 11346.3 of the Government Code requires State agencies to assess the potential for adverse economic impacts on California business enterprises and individuals when proposing to adopt or amend any administrative regulation. The assessment must include a consideration of the impact of the proposed regulation on California jobs; business expansion, elimination or creation; and the ability of California business to compete with businesses in other states.

1. Potential Impact on California Businesses

Our profitability analysis shows no significant change in the average profitability of affected businesses that manufacture the products subject to these proposed amendments. Our analysis assumes that the companies absorbed the entire costs of compliance. However, some individual companies may experience declines in profitability that are different than what we predict. In these instances we believe that these manufacturers will pass through at least a portion of their compliance costs to maintain profitability. To the extent that businesses are able to pass on the increased costs to consumers, the adverse impact of the proposed measures would be less than projected in this analysis. Furthermore, the projected impact will be less if businesses are able to improve their operational efficiency, thus reducing their costs.

Nevertheless, the proposed measures may impose economic hardship on some businesses with very little or no margin of profitability. These businesses, if hard pressed, can seek relief under the variance provision of the consumer products regulation for extensions to their compliance dates. Such extensions may provide

sufficient time to minimize the cost impacts to these businesses. Additional mitigation may be achieved by taking advantage of the compliance flexibility offered by the existing Innovative Product Provision (IPP) and the Alternative Control Plan (ACP) Regulation (see Section F of this chapter and section G of Chapter IX).

2. Potential Impact on Business Creation, Elimination or Expansion

The proposed amendments would have no noticeable impact on the status of California businesses. This is because most affected businesses are expected to be able to pass on the bulk of the reformulation cost to consumers in terms of higher prices for their products. Should the proposed measures impose significant hardship on California businesses, temporary relief in the form of a compliance date extension under the variance provision may be warranted.

On the other hand, the proposed measures may provide business opportunities for some California businesses or result in the creation of new businesses. California businesses which supply raw materials and equipment or provide consulting services to affected industries may benefit from increased industry spending on reformulation.

3. Potential Impact on Business Competitiveness

The proposed measures would have no significant impact on the ability of California businesses to compete with businesses in other states. Because the proposed measures would apply to all businesses that manufacture or market certain consumer products regardless of their location, the staff's proposal should not present any economic disadvantages specific to California businesses.

Nevertheless, the proposed amendments may have an adverse impact on the competitive position of some small, marginal businesses in California if these businesses lack resources to develop commercially acceptable products in a timely manner. As stated above, such impacts can be mitigated to a degree with a justified compliance extension under the variance provision of the Consumer Products Regulation, or through additional regulatory flexibility afforded by the IPP or the ACP Regulation (see Section F of this chapter and Section G of Chapter IX).

4. Potential Impact on California Employment

The proposed amendments are not expected to cause a noticeable change in California employment and payroll. As shown in Table VIII-8, according to the U.S. Department of Commerce, California employment in the industries affected by the proposed amendments was about 3,574 in 2008, or about 6.0 percent of national employment in the affected industries. This represents less than 1 percent of manufacturing employment in California. Also, as shown in Table VIII-8, these employees generated about \$188,488 million in payroll, or about 5.5 percent of national payroll in the affected industries. This also accounts for less than 1 percent of the total California manufacturing payroll in 2008.

**Table VIII-8
California Employment and Payroll in Affected Industries**

NAICS	Number of Employees		Payroll	
	California	California Share as Percent of U.S.	California (thousand dollars in 2008)	California Share as Percent of U.S.
325611	952	4.4	46,606	4.1
325612	1400	8.1	70,360	7.4
325320	647	5.7	35,741	5.0
324191	575	5.6	35,781	5.8
Total	3,574	5.9	188,488	5.5

Source: (County Business Patterns, 2008)

5. Impacts on California Consumers

The potential impact of the proposed amendments on consumers depends upon the ability of affected businesses to pass on the cost increases to consumers. However, competitive market forces may prevent businesses from passing their cost increases on to consumers. Thus, we do not expect a significant change in retail prices.

Assuming the affected industry will pass on the entire compliance costs to consumers in terms of higher prices, we estimate the average price of a product (including typical retail mark-up) would be about \$0.06. This value is different than reported earlier in the chapter. In the analysis here, we assume that a manufacturer will choose to spread the cost of compliance among all products they manufacture (not just those affected by this proposal).

The proposed amendments may also affect consumers adversely if they result in reduced performance attributes of the products. However, this scenario is unlikely to occur for the following reasons. First, for the proposed limits, there are already complying products with a market presence. Thus, the industry already has the technology to manufacture compliant products that satisfy consumers. Second, marketers are unlikely to introduce a product which does not meet their consumers' expectations. This is because such an introduction would be damaging not only to the product sale, but also to the sale of other products sold under the same brand name (impairing so-called "brand loyalty"). Finally, the Board has provided flexibility, under the existing consumer products program, to businesses whose situations warrant an extension to their compliance dates. For companies that can justify such variances, the additional time may afford more opportunity to explore different formulation, cost-cutting, performance-enhancing, or other marketing strategies which can help make the transition to new complying products nearly transparent to consumers.

6. Potential Impacts to California State or Local Agencies

State agencies are required to estimate the cost or savings to any State or local agency and school district in accordance with instructions adopted by the Department of Finance. The estimate shall include any nondiscretionary cost or savings to local agencies and the cost or savings in federal funding to the State.

We have determined that the proposed limits will not create costs or savings, as defined in Government Code section 11346.5(a)(6), to any State agency or in federal funding to the State, costs or mandate to any local agency or school district whether or not reimbursable by the State pursuant to Part 7 (commencing with section 17500), Division 4, title 2 of the Government Code, or other nondiscretionary savings to local agencies.

We are aware that the California Prison Industry Authority (PIA) manufactures some products for which VOC limits are proposed. Based on their response to the 2006 Survey, the PIA manufactures nonaerosol "General Purpose Cleaner," "General Purpose Degreaser," and "Glass Cleaner" products. All of these reported products already comply with the proposed VOC limits for these categories. Therefore, we expect no impacts on the PIA.

ARB will have costs for enforcing the proposed amendments. It is estimated that beginning in fiscal year 2012-13 the Enforcement Division will require an additional 1.5 staff. The costs for these additional resources will need to be addressed in the future.

E. Other Possible Economic Impacts of Regulatory Changes

In addition to the proposed VOC limits, there are other proposed amendments to the Consumer Products Regulation, some of which may have a potential economic impact on affected businesses. While we do not expect any significant economic impact from any of the proposals, it is possible that there could be some increased cost to business resulting from proposed changes.

F. Mitigation of Potential Impacts Through Additional Regulatory Flexibility

If adopted by the Board, the proposed VOC limits will be incorporated in section 94509 of the Consumer Products Regulation (title 17, California Code of Regulations, sections 94507-94517). To complement the mandatory VOC limits, the existing consumer products program provides compliance flexibility, through two voluntary, market-based programs: the IPP and the ACP Regulation. These options could be evaluated to minimize cost impacts. The IPP (section 94511) allows manufacturers to sell products that have VOC contents greater than the applicable VOC limit, provided they demonstrate that such products actually emit less VOCs, on a per use basis, than representative products that comply with the VOC limit. Using the emissions averaging

approach, the ACP is a voluntary regulation (title 17, CCR, sections 94540-94555) designed to allow multi-product VOC averaging as an alternative means of complying with the VOC limits. Additional information on these provisions is contained in Chapter IX, section G.

Based on participation, it is reasonable to conclude that manufacturers are using these programs to provide consumers with products that meet their needs, while lowering costs, improving the “market value” of their products, or otherwise maintaining profit margins.

Overall, most affected businesses will benefit from the IPP and the ACP Regulation. Both programs are completely voluntary and impose no additional costs to businesses to meet the requirements other than testing and reporting requirements. Manufacturers who take advantage of these market-based programs presumably do so because it costs less than direct compliance with the limits or it provides some other market benefits.

According to previous analyses, the potential cost differential which might result from competition under the ACP between small and large firms would not necessarily cause extreme hardship on small firms. However, inclusion of products subject to the proposed limits in an ACP may affect the level of competition among companies, which could lead to the elimination of some marginal producers for those products. Such competition may also have minor impacts on California employment and payroll. However, the impact is expected to be positive in the long term. Any potential impacts on the ability of California businesses to compete with businesses in other states are also expected to be minimal.

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Chapter IX. Environmental Impacts

In this rulemaking, ARB staff is proposing amendments to the Consumer Products Regulation that are designed to reduce volatile organic compound (VOC) emissions. Mitigation measures are also proposed to ensure that use of certain toxic air contaminants (TAC), greenhouse gas (GHG) compounds with higher global warming potential (GWP) values, and certain surfactants known to be toxic to aquatic species, are not used as products reformulate to meet the proposed VOC limits.

We have evaluated the environmental impacts of the proposed amendments on atmospheric processes and other media. Overall, we found that the proposed amendments would have beneficial effects. In making this determination, we evaluated how the proposed amendments would impact ground-level ozone concentrations, particulate matter (secondary organic aerosols), climate change, stratospheric ozone depletion, air toxic emissions, water quality, solid waste, and energy use.

Staff has conducted a qualitative health risk assessment that concludes that public health would be further protected by adoption of the proposed amendments. This finding is primarily related to the decrease in ground-level ozone concentrations that would result if the proposal were adopted. Staff has also determined that the public's exposure to TACs will be reduced by the proposed mitigation measure to prohibit use of methylene chloride, perchloroethylene, and trichloroethylene in several product categories.

Our analysis of the reasonably foreseeable environmental impacts of the methods of compliance is presented in subsections C through H below. Regarding reasonably foreseeable mitigation measures, the California Environmental Quality Act (CEQA) requires an agency to identify and adopt feasible mitigation measures that would minimize any significant adverse environmental impacts described in the environmental analysis.

A. Legal Requirements Applicable to the Analysis

The CEQA and ARB policy require an analysis to determine the potential adverse environmental impacts of proposed regulations. Because ARB's program involving the adoption of regulations has been certified by the Secretary of Resources (see Public Resources Code section 21080.5), the CEQA environmental analysis requirements are allowed to be included in ARB's Initial Statement of Reasons instead of preparing an environmental impact report or negative declaration. In addition, ARB will respond in writing to all significant environmental points raised by the public during the public

review period or at the Board hearing. These responses will be contained in the Final Statement of Reasons for these proposed amendments.

Public Resources Code section 21159 requires that the environmental impact analysis conducted by ARB include the following:

- (1) an analysis of the reasonably foreseeable environmental impacts of the methods of compliance;
- (2) an analysis of reasonably foreseeable feasible mitigation measures; and,
- (3) an analysis of reasonably foreseeable alternative means of compliance with the regulation.

Before we present our analysis of the environmental impacts of the proposal, for ease of the reader the proposed amendments are summarized in Part B.

B. Summary of Proposed Amendments

Staff is proposing to establish lower VOC limits for 11 consumer product categories. These limits would reduce VOC emissions by about 6.9 tons per day when fully effective. The proposed amendments to reduce VOC emissions would partially fulfill the consumer product reduction commitment contained in the 2007 State Implementation Plan (SIP) to meet the national ozone standard.

Several other regulatory modifications are proposed and necessary to implement the new requirements. These other regulatory proposals include:

- Modifying several definitions and proposing two new definitions;
- Prohibiting use of methylene chloride, perchloroethylene, and trichloroethylene in products described as Silicone-based Multi-purpose Lubricant, Special-purpose Lubricant, Metal Polish or Cleanser, and Spot Remover products used on dry clean only fabrics (other Spot Remover products are subject to an existing prohibition on use of these TACs).
- Prohibiting use of compounds with GWP values at or above 150 in Flying Bug Insecticide, Furniture Maintenance Product, Metal Polish or Cleanser, Special-purpose Lubricant, Spot Remover, and Wasp or Hornet Insecticide products;
- Prohibiting use of alkylphenol ethoxylate surfactants in General Purpose Cleaner (nonaerosol), General Purpose Degreaser (nonaerosol), Glass Cleaner (nonaerosol), Heavy-duty Hand Cleaner or Soap (nonaerosol), and Oven or Grill Cleaner products.
- Consolidating and clarifying some existing regulatory provisions; and
- Modifying Test Method 310 by adding the procedures for determining the VOC content of Fabric Softener-Single Use Dryer Products and determining aromatic compound content of Paint Thinners and Multi-purpose Solvent products.

C. Summary of Impacts on Atmospheric Processes

In this section, we evaluate the impacts on atmospheric processes. The evaluation includes our assessment of whether the proposed amendments would have a positive, negative, or no impact on these atmospheric processes.

1. Impacts of Proposed Amendments on Ground-level Ozone Concentrations

Enhanced ground-level ozone formation involves the interaction between VOCs and oxides of nitrogen (NO_x) in the presence of sunlight. The rate of ozone generation is related closely to the amount and reactivity of VOC emissions as well as the amount of NO_x emissions available in the atmosphere (Seinfeld and Pandis, 1998). It is one of the State's most persistent air quality problems. Research has shown that, when inhaled, ozone can cause respiratory problems, aggravate asthma, impair the immune system, and cause increased risk of premature death. Ozone also adversely affects vegetation throughout most of California. More information on the impacts of exposure to ozone can be found in Chapter IV, of this Technical Support Document.

a. Proposed VOC Standards: The proposed amendments are designed to reduce VOC emissions by about 6.9 tons per day when fully effective. Reducing these ozone precursor emissions will result in a positive environmental impact by lowering the concentrations of ground-level ozone in the atmosphere. The categories proposed for regulation and the corresponding VOC emission reductions are shown in Table IX-1.

b. Proposed Toxics Prohibition: In accordance with CEQA, we are proposing a mitigation measure to ensure that emissions of methylene chloride, perchloroethylene, and trichloroethylene are not used as products are reformulated. We are proposing to prohibit the use of methylene chloride, perchloroethylene, and trichloroethylene in products described as Silicone-based Multi-purpose Lubricant, Special-purpose Lubricant, Metal Polish or Cleanser, and Spot Remover products used on dry clean only fabrics. The prohibition of these three solvents is necessary, particularly for methylene chloride and perchloroethylene, because they are exempt VOCs and could be used in reformulated products without 'counting' toward VOC content. However, the proposal to prohibit their use in these products could result in a slight increase in VOC emissions. This is because products containing these TACs may have to be reformulated using VOC solvents. Staff, therefore, evaluated the potential for VOC emission increases resulting from this proposal.

Table IX-1
Proposed VOC Limits, Emissions, and Reductions at Effective Date

Product Category	Product Form	Proposed VOC Limit (weight percent)	2010 VOC Emissions* (tons per day)	Effective Date	VOC Reductions at Effective Date (tons per day)
Flying Bug Insecticide	Aerosol	20	0.65	12/31/2013	0.06
Furniture Maintenance Product	Aerosol	12	1.32	12/31/2013	0.36
General Purpose Cleaner	Nonaerosol	0.5	12.04	12/31/2012	3.73
General Purpose Degreaser	Nonaerosol	0.5	1.91	12/31/2012	1.17
Glass Cleaner	Nonaerosol	3	3.34	12/31/2012	0.41
Heavy-duty Hand Cleaner or Soap	Nonaerosol	1	0.79	12/31/2013	0.53
Metal Polish or Cleanser	Aerosol	15	0.22	12/31/2012	0.07
Metal Polish or Cleanser	Nonaerosol	3	0.20	12/31/2012	0.15
Oven or Grill Cleaner	Aerosol	8	0.08	12/31/2012	>0.0
Oven or Grill Cleaner	Nonaerosol	4	0.24	12/31/2012	-0.12
Special-purpose Lubricant	Aerosol	25	0.26	12/31/2012	0.10
Special-purpose Lubricant	Nonaerosol	3	0.18	12/31/2012	0.13
Spot Remover (Dry Clean Only)	Aerosol	15	>0.0	12/31/2012	>0.0
Spot Remover (Dry Clean Only)	Nonaerosol	3	0.17	12/31/2012	0.17
Wasp or Hornet Insecticide	Aerosol	10	0.31	12/31/2013	0.14
Total Emissions 2010	21.7 tons per day				
Total VOC Reductions Creditable Toward 2007 SIP	6.7 tons per day				
Total VOC Reductions Creditable Toward Future Commitment	0.2 tons per day				

* Survey emissions adjusted for market coverage and grown to the 2010 calendar year

The emissions of chlorinated solvents in these products totals about 0.1 tons per day. All but a small fraction of this total (< 1 percent) is emissions of trichloroethylene. Because this solvent is a VOC, as a matter of course, its use would essentially be

precluded by imposition of the VOC limits. Therefore, we have concluded that VOC emissions would not increase as a result of the proposed prohibitions. The proposed prohibition, then, would have no adverse impact on ground-level ozone concentrations. If there were to be a very small increase in VOC emissions we believe that preventing exposure to these TAC solvents outweighs the very small VOC emission increase that may occur.

c. Proposed Global Warming Potential Limits: In accordance with CEQA, we are proposing a global warming potential (GWP) limit of 150 for compounds used in Flying Bug Insecticide, Furniture Maintenance Product, Metal Polish or Cleanser, Special-purpose Lubricant, Spot Remover, and Wasp or Hornet Insecticide products. Absent this provision, use of several compounds with GWP values at or above 150 could result in some small additional ozone reduction benefit if they were to be used in reformulations.

d. Proposed Prohibition on Use of Alkylphenol Ethoxylate Surfactants: We are proposing to prohibit the use of alkylphenol ethoxylate surfactants in Oven or Grill Cleaner products and in the nonaerosol forms of General Purpose Cleaner, General Purpose Degreaser, Glass Cleaner, and Heavy-duty Hand Cleaner or Soap products. We do not expect this proposal to have an impact on ground level ozone concentrations. While this prohibition would eliminate one potential reformulation option, many other surfactants are suitable, and readily available, for use in these categories, making the use of alkylphenol ethoxylate surfactants unnecessary. These surfactants are considered low vapor pressure (LVP) VOC compounds and do not count toward a product's VOC content. Because of the many alternatives available, precluding the use of alkylphenol ethoxylate surfactants does not necessitate raising the proposed VOC limit.

e. Proposed New and Modified Definitions: We expect no impact on ground-level ozone concentrations resulting from the proposed new and modified definitions. These definitions are necessary to describe or clarify the types of products that are subject to the VOC limits, but do not themselves impose any requirements that would impact ground level ozone concentrations.

f. Other Proposed Amendments: A number of modifications to the regulatory language are proposed to consolidate various toxic prohibitions, consolidate GWP limits, and to clarify other provisions of the regulation. These clarifications may result in an incremental improvement in compliance and therefore, could result in an additional ozone reduction benefit.

g. Proposed Changes to Method 310: The proposed changes to Method 310 would add the procedures for determining the VOC content of Fabric Softener-Single Use Dryer Products and determining aromatic compound content of Paint Thinner and Multi-purpose Solvent products. These procedures themselves are expected to have no impact on ground level ozone concentrations. However, the proposals would allow enforcement of requirements designed to reduce ozone concentrations.

2. Impacts of Proposed Amendments on Particulate Matter (Secondary Organic Aerosols)

Fine particulate matter (PM) is prevalent in the urban atmosphere (see, for example, Pandis *et al.*, 1992). Ambient PM, especially those with diameters less than two and a half micrometers (PM_{2.5}), is known to have negative impacts on human health (Schwartz *et al.*, 1996; Moolgavkar and Luebeck, 1996). Similarly to ozone, PM can be formed via atmospheric oxidation of organic compounds (Finlayson-Pitts and Pitts, 2000). Modeling techniques to determine the amount of ozone as well as the amount of aerosol formed from a VOC have been established (Bowman *et al.*, 1994), and a concept similar to maximum incremental reactivity is being applied to quantitatively assess the aerosol formation potential of a VOC (i.e. incremental aerosol reactivity) (Griffin *et al.*, 1999). More information on the health impacts of PM is found in Chapter IV of the report.

Although most organic compounds contribute to ozone formation, SOA is usually formed from photooxidation of VOCs with carbon numbers equal to six or more (Seinfeld and Pandis, 1998). It has also been shown that aromatic compounds are more likely to participate in the formation of SOA than are alkanes (Grosjean, 1992; Pandis *et al.*, 1992). In other words, only chemicals that react fast enough in the atmosphere will generate sufficient amounts of low volatility products for forming aerosols. The analysis of the impact on SOA formation resulting from implementing the proposed VOC limits is detailed below.

In general terms, the potential to form SOA among common classes of VOCs used in consumer products could be described by the following order, with the lower molecular weight alkanes and ketones being least likely:

Least Likely	Lower molecular weight alkanes and ketones (6 carbons or less)
	Higher molecular weight alkanes
	Higher molecular weight aromatics (polysubstituted benzenes)
More Likely	Lower molecular weight aromatics (C6 - C8 compounds)

a. Proposed VOC Standards: The analysis of the potential impact on PM formation from the proposed VOC limits assumes that to meet the proposed limits will require replacing about 6.9 tons per day of VOC ingredients with 6.9 tons per day of non-VOC ingredients or exempt VOCs. To meet the proposed VOC limits, manufacturers generally have five reformulation options: use of exempt VOCs, such as acetone or methyl acetate; use of LVP-VOC solvents; use of surfactants; use of water; increasing 'solids' content; or use of non-VOC propellants. Substitution for VOCs with water, higher solids content, or non-VOC propellants would likely result in a small reduction in SOA formation. The most likely exempt VOC solvents that could be used to comply, acetone and methyl acetate, both having three carbon atoms, have little potential to contribute to SOA formation. Indeed, it has been predicted that there would be no SOA

yield from acetone (Pandis *et al.*, 1992). Hence, use of these compounds could also result in a reduction in SOA.

If manufacturers were to reduce overall VOC content to comply with the proposed limits by reformulating with smaller amounts of stronger VOC solvents could result in increased SOA formation. This is because the commonly used stronger solvents are aromatic compounds, such as xylenes and toluene, which are known to have higher SOA potentials than other commonly used VOCs. In the categories proposed for regulation we do not believe that aromatic compounds are a likely reformulation pathway. Therefore, we expect no increase in SOA due to use of aromatic compounds. However, substitution of LVP-VOC solvents for VOCs could result in a slight SOA increase (Chan *et al.*, 2009).

Because we can not predict how manufacturers will choose to reformulate, we can not fully evaluate the potential for increased SOA formation. However, it is likely to be only a slight potential for increase, if any, due to the variety of reformulation options available. At any rate, it will not be a significant adverse impact. Additionally, any reformulations that result in increased SOA would likely be offset by reformulations resulting in lower SOA. For example, one potential reformulation option for Heavy Duty Hand Cleaner or Soap products would be to substitute an LVP-VOC hydrocarbon solvent for terpenes such as d-limonene, a VOC. D-limonene can react with ozone to form a variety of secondary products including formaldehyde and SOA (Singer *et al.*, 2006). Potential use of this proposed reformulation option could result in lower SOA formation. We will continue to monitor implementation of the regulation and reassess the impacts as more data quantitative data on SOA formation potentials become available.

b. Proposed Toxics Prohibition: The proposal to prohibit use of methylene chloride, perchloroethylene, and trichloroethylene in products described as Silicone-based Multi-purpose Lubricant, Special-purpose Lubricant, Metal Polish or Cleanser, and Spot Remover products used on dry clean only fabrics should have no or negligible impacts on SOA formation. These compounds are not expected to be potent participants in SOA formation because they are small molecules and have only one or two carbon atoms. By precluding use of these solvents in current formulations and as a reformulation option, we would potentially relinquish some additional small reduction in the production of SOA. For example, if these TAC solvents, rather than LVP-VOC solvents were to be used, the SOA formation potential of reformulated products could be slightly lower. However, we believe that preventing the public's exposure to these TAC solvents, which are potential human carcinogens, outweighs the uncertain small potential for a reduction in SOA.

c. Proposed Global Warming Potential Limits: The proposed GWP limit of 150 for compounds used in the reformulation of Flying Bug Insecticide, Furniture Maintenance Product, Metal Polish or Cleanser, Special-purpose Lubricant, Spot Remover, and Wasp or Hornet Insecticide products is expected to have negligible or no impact on PM or SOA formation. We do not believe that compounds with GWP values at or above

150 could be substituted in such a way to significantly change the amount of SOA formed from these categories.

d. Proposed Prohibition on Use of Alkylphenol Ethoxylate Surfactants: We are proposing to prohibit the use of octylphenol and nonylphenol ethoxylate surfactants in Oven or Grill Cleaner products and in the nonaerosol forms of General Purpose Cleaner, General Purpose Degreaser, Glass Cleaner, and Heavy-duty Hand Cleaner or Soap products. We expect this proposal to have a neutral impact on SOA formation. Alkylphenol ethoxylate surfactants, as well as other surfactants that would be used in these categories, are considered LVP-VOC compounds and do not count toward a product's VOC content. It is also unlikely that these large molecules have an air fate. Therefore, regardless of which surfactant is selected, the impacts on SOA, if any, are likely similar.

e. Proposed New and Modified Definitions: We expect no impact on SOA formation resulting from the proposed new and modified definitions. These definitions are necessary to describe or clarify the types of products that are subject to the VOC limits but do not themselves impose any requirements that would affect SOA formation.

f. Other Proposed Amendments: A number of modifications to the regulatory language are proposed to consolidate various toxic prohibitions, consolidate GWP limits, and to clarify other provisions of the regulation. These consolidations of existing requirements, and language clarifications do not result in any change to the environment. Therefore, we expect these amendments to have no impact on SOA formation.

g. Proposed Changes to Method 310: The proposed changes to Method 310 would add the procedures for determining the VOC content of Fabric Softener-Single Use Dryer Products and determining aromatic compound content of Paint Thinner and Multi-purpose Solvent products. These procedures themselves impose no requirements and should have no impact on SOA formation.

3. Impacts of Proposed Amendments on Climate Change

Climate change or global warming is the process whereby emissions of anthropogenic pollutants, together with other naturally-occurring gases, absorb infrared radiation in the atmosphere, leading to increases in the overall average global temperature.

Gases in the atmosphere can contribute to the greenhouse effect both directly and indirectly. Direct effects occur when the gas itself is a GHG. Indirect radiative forcing occurs when chemical transformations of the original gas produce other GHGs, when a gas influences the atmospheric lifetimes of methane, and/or when a gas affects atmospheric processes that alter the radiative balance of the earth (e.g., affect cloud formation).

Compounds with direct effects include VOCs, carbon dioxide (CO₂), hydrofluorocarbons (HFCs), hydrofluoroethers (HFEs), and hydrochlorofluorocarbons (HCFCs). Even though VOCs have direct effects, they are considered GHGs primarily because of their role in creating ozone and in prolonging the life of methane in the atmosphere, although the effect varies depending on local air quality. More information on climate change can be found in Chapter IV of this report.

a. Proposed VOC Standards: As described above, VOCs are considered GHGs because of their role in ground-level ozone formation. However, because these amendments would reduce the total amount of VOCs, and thereby ground-level ozone concentrations, the proposed VOC limits should have an overall positive impact on climate change. However, two reformulation options may lead to very slight increases in GHG emissions. These are discussed below.

To meet the proposed VOC limits, CO₂, to a limited extent, could be used to replace hydrocarbon propellants in some consumer product categories. The survey data indicate that CO₂ is already used in certain consumer products proposed for regulation, including Special-purpose Lubricant and Wasp or Hornet Insecticide products. In these categories CO₂ use is likely to increase as manufacturers reformulate to meet the lower proposed VOC limits. In other categories with aerosol product forms, CO₂ may also be a reformulation pathway. Even though CO₂ has a direct impact on climate change, co-benefits are expected to the extent that CO₂ replaces VOC propellants in consumer products. Specifically, less ozone and methane will be formed. Further, the contribution of CO₂ to global warming is likely less than that of the VOC being replaced. In addition, most CO₂ used as propellant is a recycled by-product of existing processes and, therefore, does not increase global warming from a lifecycle standpoint (ARB, 1999).

Another reformulation path for the aerosol products may be to replace some or all the typical hydrocarbon propellants with HFC-152a or HFC-134a. These compounds are exempt VOCs, but are global warming compounds. HFC-152a and HFC-134a have global warming potentials of 140 and 1,300, respectively. Limited use of the moderately warming compound HFC-152a was reported in several categories proposed for regulation. No use of the higher warming HFC-134a was reported. Staff has proposed limits that are achievable without the use of either of these exempt propellants. Because of this, along with the substantially higher cost of these propellants, we do not expect emissions of HFC-152a to increase. As described later in section E of this chapter, to ensure that reformulating to meet the VOC limits does not result in an adverse impact on climate change we are proposing to preclude use of compounds with GWP values at or above 150. This proposed mitigation measure will ensure that there would be no additional impact on climate change from use of these global warming compounds.

b. Proposed Toxics Prohibition: The proposal to prohibit use of methylene chloride, perchloroethylene, and trichloroethylene in products described as Silicone-based Multi-purpose Lubricant, Special-purpose Lubricant, Metal Polish or Cleanser, and Spot Remover products used on dry clean only fabrics will likely have no or negligible

impacts on climate change. Even if VOCs or compounds with GWP values less than 150 were used to replace TACs in these products there would be a negligible increase in global warming compound emissions because the total amount of these TACs is less than 0.1 tons per day.

c. Proposed Global Warming Potential Limits: The proposed GWP limit of 150 for compounds used in Flying Bug Insecticide, Furniture Maintenance Product, Metal Polish or Cleanser, Spot Remover, Special-purpose Lubricant, and Wasp or Hornet Insecticide products is designed to minimize the climate change impacts of the emissions from products in these categories. Therefore, we expect the proposal to have overall beneficial impacts on climate change by preventing use of compounds with higher GWP values.

d. Proposed Prohibition on Use of Ethoxylate Surfactants: We are proposing to prohibit the use of alkylphenol ethoxylate surfactants in Oven or Grill Cleaner products and in the nonaerosol forms of General Purpose Cleaner, General Purpose Degreaser, Glass Cleaner, and Heavy-duty Hand Cleaner or Soap products. We do not expect this proposal to have an impact on climate change because the compounds that would be used in place of the alkylphenol ethoxylate surfactants are not global warming compounds.

e. Proposed New and Modified Definitions: We expect no impact on climate change resulting from the proposed new and modified definitions. These definitions are necessary to describe or clarify the types of products that are subject to the VOC limits but do not themselves impose any requirements that would affect climate change.

f. Other Proposed Amendments: A number of modifications to the regulatory language are proposed to consolidate various toxic prohibitions, consolidate GWP limits, and to clarify other provisions of the regulation. These consolidations of existing requirements, and language clarifications do not result in any change to the environment. Therefore we expect these amendments to have no impact on climate change.

g. Proposed Changes to Method 310: The proposed changes to Method 310 would add the procedures for determining the VOC content of Fabric Softener-Single Use Dryer Products and determining aromatic compound content of Paint Thinner and Multi-purpose Solvent products. These procedures themselves impose no requirements and should have no impact on climate change.

4. Impacts of Proposed Amendments on Stratospheric Ozone Depletion

The stratospheric ozone layer shields the earth from harmful ultraviolet (UV) radiation. Depletion of the earth's ozone layer allows a higher penetration of UV radiation to the earth's surface. This increase in UV radiation penetration leads to a greater incidence of skin cancer, cataracts, and impaired immune systems. Reduced crop yields and diminished ocean productivity are also expected. Because the chemical reactions,

which form ground-level ozone are driven by UV radiation, it is conceivable that a reduction in stratospheric ozone concentrations may also result in an increase in the formation of photochemical smog because of the increased levels of UV radiation on the earth's surface (ARB, 2000). The chemicals most implicated as causing stratospheric ozone depletion are chlorofluorocarbons (CFCs), HCFCs, and halons (U.S. EPA, 2003a). Specifically, the chlorine or bromine atoms released by photolysis of the compounds react in chain reactions leading to the catalytic destruction of ozone (Finlayson-Pitts and Pitts, 2000).

Solar irradiation in the stratosphere contains sufficient UV light to break down CFCs and HCFCs to yield chlorine atoms that convert ozone to molecular oxygen. However, this UV light is not strong enough to break down HFCs and HFEs to create fluorine atoms. In addition, the molecular structure of HFCs and HFEs includes hydrogen atoms, which renders them susceptible to attack by hydroxyl radicals in the troposphere. Therefore, these chemicals have a relatively short atmospheric lifetime, which does not allow any appreciable amounts to penetrate into the stratosphere (ARB, 2008d).

To address stratospheric ozone depletion, the Montreal protocol was enacted in 1989, to phase out a number of CFCs, HCFCs, and halons. As a signatory of this protocol, the United States, in the Federal Clean Air Act of 1990 established timetables for ceasing production (see part 40, Code of Federal Regulations, section 602). In general, the protocol establishes dates by which certain compounds can no longer be manufactured; however, existing stocks can continue to be used in some applications until exhausted.

a. Proposed VOC Standards: Reducing VOCs will have no impact on stratospheric ozone depletion. As products reformulate to meet the proposed VOC limits, provisions in the Consumer Products Regulation (see section 94509(e)) already prohibit the use of various stratospheric ozone depleting compounds. This provision ensures there will be no increased use of stratospheric ozone depleting compounds.

b. Proposed Toxics Prohibition: The proposal to prohibit use of methylene chloride, perchloroethylene, and trichloroethylene in products described as Silicone-based Multi-purpose Lubricant, Special-purpose Lubricant, Metal Polish or Cleanser, and Spot Remover products used on dry clean only fabrics should have no impact on stratospheric ozone depletion. In order to comply with this prohibition, VOCs may replace these TACs in reformulated products. VOCs are not stratospheric ozone depleting compounds. It should also be noted that manufacturers are precluded from reformulating with stratospheric ozone depleting compounds because use of these compounds is already restricted by the Consumer Products Regulation (see section 94509(e)).

c. Proposed Global Warming Potential Limits: The proposed GWP limit of 150 for compounds used in Flying Bug Insecticide, Furniture Maintenance Product, Metal Polish or Cleanser, Spot Remover, Special-purpose Lubricant, and Wasp or Hornet Insecticide products will ensure that these products' emissions do not contribute to further depletion

of the stratospheric ozone layer. This is because some compounds with higher GWPs are also stratospheric ozone depleting compounds.

d. Proposed Prohibition on Use of Alkylphenol Ethoxylate Surfactants: We are proposing to prohibit the use of alkylphenol ethoxylate surfactants in Oven or Grill Cleaner products and in the nonaerosol forms of General Purpose Cleaner, General Purpose Degreaser, Glass Cleaner, and Heavy-duty Hand Cleaner or Soap products. We do not expect this proposal to have an impact on stratospheric ozone depletion because the compounds that would be used in place of the alkylphenol ethoxylate surfactants are not stratospheric ozone depleting compounds.

e. Proposed New and Modified Definitions: We expect no impact on stratospheric ozone depletion resulting from the proposed new and modified definitions. These definitions are necessary to describe or clarify the types of products that are subject to the VOC limits but do not themselves impose any requirements that would have an impact on stratospheric ozone depletion.

f. Other Proposed Amendments: A number of modifications to the regulatory language are proposed to consolidate various toxic prohibitions, consolidate GWP limits, and to clarify other provisions of the regulation. These consolidations of existing requirements, and language clarifications do not result in any change to the environment. Therefore, we expect these amendments to have no impact on stratospheric ozone depletion.

g. Proposed Changes to Method 310: The proposed changes to Method 310 would add the procedures for determining the VOC content of Fabric Softener-Single Use Dryer Products and determining aromatic compound content of Paint Thinner and Multi-purpose Solvent products. These procedures themselves impose no requirements and should have no impact on stratospheric ozone depletion.

D. Other Potential Environmental Impacts

In section C we evaluated the proposed amendments' impacts on air quality. In this section we provide an analysis as to whether the proposed amendments would impact other media.

1. Impacts of Proposed Amendments on Solid Waste Disposal

Consumer products contribute to the solid waste stream by virtue of the packaging, container, or mechanism such as towelettes or "wipes" used to deliver the product. Therefore, we evaluated the potential impacts of the proposed amendments on the solid waste stream.

a. Proposed VOC Standards: We do not expect an adverse impact on solid waste disposal from the proposed amendments relating to VOC limits. Most of the reformulation options include increasing production of existing complying products,

using water-based formulations, or replacing VOC solvents with exempt compounds or LVP-VOC solvents. These reformulation options are not expected to alter the current methods of packaging, container, delivery mechanism.

b. Proposed Toxics Prohibition: The proposal to prohibit use of methylene chloride, perchloroethylene, and trichloroethylene in products described as Silicone-based Multi-purpose Lubricant, Special-purpose Lubricant, Metal Polish or Cleanser, and Spot Remover products used on dry clean only fabrics should have no impact on solid waste disposal because the compounds used to replace them require no different packaging, or additional packaging. In addition, this proposed prohibition on use of chlorinated TAC solvents should ensure that there is no increased hazardous waste disposal.

c. Proposed Global Warming Potential Limits: The proposed GWP limit of 150 for compounds used in Flying Bug Insecticide, Furniture Maintenance Product, Metal Polish or Cleanser, Spot Remover, Special-purpose Lubricant, Wasp or Hornet Insecticide products is expected to have no impact on waste disposal. Implementing this proposal does not cause a change in the manner in which products are to be disposed.

d. Proposed Prohibition on Use of Ethoxylate Surfactants: We are proposing to prohibit the use of alkylphenol ethoxylate surfactants in Oven or Grill Cleaner products and in the nonaerosol forms of General Purpose Cleaner, General Purpose Degreaser, Glass Cleaner, and Heavy-duty Hand Cleaner or Soap products. We do not expect this proposal to have an impact on solid waste disposal because the compounds that would be used in place of the alkylphenol ethoxylate surfactants are not disposed of in a manner that would be different.

e. Proposed New and Modified Definitions: We expect no impact on solid waste disposal resulting from the proposed new and modified definitions. These definitions are necessary to describe or clarify the types of products that are subject to the VOC limits but do not themselves impose any requirements that would affect solid waste disposal.

f. Other Proposed Amendments: A number of modifications to the regulatory language are proposed to consolidate various toxic prohibitions, consolidate GWP limits, and to clarify other provisions of the regulation. These consolidations of existing requirements, and language clarifications do not result in any change to the environment. Therefore, we expect these amendments to have no impact on solid waste disposal.

g. Proposed Changes to Method 310: The proposed changes to Method 310 would add the procedures for determining the VOC content of Fabric Softener-Single Use Dryer Products and determining aromatic compound content of Paint Thinner and Multi-purpose Solvent products. These procedures themselves impose no requirements and should have no impact on solid waste disposal.

2. Impacts of Proposed Amendments on Water Quality

Because of how consumer products are used there are potential water quality impacts. For example many products are diluted with water and used with a mop and bucket. This generally results in excess product that is disposed of “down the drain.” Therefore, we evaluated the impacts of the proposed amendments on water quality.

a. Proposed VOC Standards

Overall, reducing VOCs should have no impact on water quality and could ultimately result in a positive impact. As products reformulate to meet the proposed VOC limits, to a limited extent, water may replace VOCs in some products. This would have a positive impact on water quality by reducing the quantity of VOCs that might be introduced to the water supply. If exempt solvent compounds replace VOCs in reformulated products, there should be no increased impact. This is because as far as water chemistry is concerned, VOCs and VOC exempt solvents are similar. It is also true that many VOCs are biodegraded as they pass through the waste water stream.

Staff has determined that use of surfactants is a viable reformulation pathway for several cleaning products. Generally, surfactants are LVP-VOC ingredients. Depending on the type of surfactant chosen there could be water quality impacts if these surfactants are washed “down the drain.” In particular, the alkylphenol ethoxylate surfactants are known to have toxic impacts on aquatic species. They are estrogenic. In light of this, staff is proposing a specific mitigation measure as described in subpart ‘d’ of this section and in section E.

One reformulation option for nonaerosol Heavy-duty Hand Cleaner or Soap products could result in an increase in the use of abrasive ingredients. Increased amounts of abrasive ingredients will potentially be washed “down the drain,” impacting water treatment and increasing solid waste. Therefore, staff evaluated the potential that increased use of abrasives could impact water quality. We determined that there is no reason to believe that the reformulation of nonaerosol Heavy-duty Hand Cleaner or Soap products would have significant adverse impacts on water treatment systems. Approximately 60 percent of the 113 products that comply with the proposed VOC limit of 1 percent by weight contain abrasives with 12 products containing less than 1 percent by weight. About half of the complying products contain very little or no abrasive ingredients, indicating that product reformulations that do not rely on increase use of abrasives are just as likely. Moreover, should manufacturers choose to use abrasive ingredients, biodegradable materials such as crushed nut shells, seeds or corn cobs are options.

b. Proposed Toxics Prohibition: The proposal to prohibit use of methylene chloride, perchloroethylene, and trichloroethylene in products described as Silicone-based Multi-purpose Lubricant, Special-purpose Lubricant, Metal Polish or Cleanser, and Spot Remover products for use on dry clean only fabrics should have a positive impact on water quality by ensuring that these TACs will not enter the water system and

subsequently effect influent and effluent concentrations at publicly owned treatment works (POTW).

c. Proposed Global Warming Potential Limits: The proposed GWP limit of 150 for compounds used in Flying Bug Insecticide, Furniture Maintenance Product, Metal Polish or Cleanser, Spot Remover, Special-purpose Lubricant, Wasp or Hornet Insecticide products is expected to have no impact on water quality. We are not aware of compounds with GWP values at or greater than 150 that could lead to improving water quality if they were to be used in formulations. Therefore, we expect no adverse impacts from this proposed limit.

d. Proposed Prohibition on Use of Alkylphenol Ethoxylate Surfactants: We are proposing to prohibit the use of alkylphenol ethoxylate surfactants in Oven or Grill Cleaner products and in the nonaerosol forms of General Purpose Cleaner, General Purpose Degreaser, Glass Cleaner, and Heavy-duty Hand Cleaner or Soap products. We expect this proposal to have a beneficial impact on water quality because amounts of these aquatic toxicants would be reduced. The need for this prohibition is set forth in section E of this chapter.

e. Proposed New and Modified Definitions: We expect no impact on water quality resulting from the proposed new and modified definitions. These definitions are necessary to describe or clarify the types of products that are subject to the VOC limits but do not themselves impose any requirements that would affect water quality.

f. Other Proposed Amendments: A number of modifications to the regulatory language are proposed to consolidate various toxic prohibitions, consolidate GWP limits, and to clarify other provisions of the regulation. These consolidations of existing requirements, and language clarifications do not result in any change to the environment. Therefore, we expect these amendments to have no impact on water quality.

g. Proposed Changes to Method 310: The proposed changes to Method 310 would add the procedures for determining the VOC content of Fabric Softener-Single Use Dryer Products and determining aromatic compound content of Paint Thinner and Multi-purpose Solvent products. These procedures themselves impose no requirements and should have no impact on water quality.

3. Impacts of Proposed Amendments on Energy

As products are reformulated to comply with the proposed amendments staff evaluated, to the extent feasible, whether the reformulation process or finished products would impact energy consumption. Among the processes to consider would be transportation related or raw ingredient manufacturing costs.

a. Proposed VOC Standards: Reformulation of products to meet the proposed VOC limits should have no impact on energy use because we do not expect the

manufacturing processes or shipping practices to be changed. We also do not expect the manufacture of compounds used in reformulations to result in energy use above the current situation because the types of chemicals predicted to be used are similar to those being replaced.

b. Proposed Toxics Prohibition: The proposal to prohibit use of methylene chloride, perchloroethylene, and trichloroethylene in products described as Silicone-based Multi-purpose Lubricant, Special-purpose Lubricant, Metal Polish or Cleanser, and Spot Remover products used on dry clean only fabrics is expected to have negligible, or no impact on energy use. Absent the proposed prohibition, we are not aware of how these compounds could be used in a manner that would cause an appreciable change in energy use or savings.

c. Proposed Global Warming Potential Limits: The proposed GWP limit of 150 for compounds used in aerosol Flying Bug Insecticide, Furniture Maintenance Product, Metal Polish or Cleanser, Spot Remover, Special-purpose Lubricant, Wasp or Hornet Insecticide products is expected to have no impact on energy use. In the absence of this provision we are not aware of how these compounds could be used in reformulations that would cause an appreciable change in energy use or savings.

d. Proposed Prohibition on Use of Ethoxylate Surfactants: We are proposing to prohibit the use of alkylphenol ethoxylate surfactants in Oven or Grill Cleaner products and in the nonaerosol forms of General Purpose Cleaner, General Purpose Degreaser, Glass Cleaner, and Heavy-duty Hand Cleaner or Soap products. We do not expect this proposal to have an impact on energy use because the compounds that would be used in place of the alkylphenol ethoxylate surfactants are similar.

e. Proposed New and Modified Definitions: We expect no impact on energy use resulting from the proposed new and modified definitions. These definitions are necessary to describe or clarify the types of products that are subject to the VOC limits but do not themselves impose any requirements that would affect energy use.

f. Other Proposed Amendments: A number of modifications to the regulatory language are proposed to consolidate various toxic prohibitions, consolidate GWP limits, and to clarify other provisions of the regulation. These consolidations of existing requirements, and language clarifications do not impose requirements that would result in energy use that is different from energy use that would occur absent these provisions. Therefore, we expect these amendments to cause no appreciable change in energy use or savings.

g. Proposed Changes to Method 310: The proposed changes to Method 310 would add the procedures for determining the VOC content of Fabric Softener-Single Use Dryer Products and determining aromatic compound content of Paint Thinner and Multi-purpose Solvent products. These procedures themselves impose no requirements and should have no impact on energy use.

E. Analysis of Need for Reasonably Foreseeable Mitigation Measures

As part of our obligations under CEQA, ARB staff is required to evaluate and mitigate potential adverse environmental impacts resulting from regulatory proposals. Also, pursuant to Health and Safety Code section 39650 *et seq.*, the ARB is required to identify and control TACs. The Health and Safety Code defines a TAC as "...an air pollutant which may cause or contribute to an increase in mortality or serious illness, or which may pose a hazard to human health." Moreover, in accordance with section 39666 of the Health and Safety Code, for TACs for which no safe exposure threshold has been established, the ARB is required to "... reduce emissions to the lowest level achievable through application of best available control technology or a more effective control method...."

Several chemicals currently used in the products for which VOC limits are proposed, or that are potential reformulation options, are known to have health impacts, or otherwise adversely impact the environment. An increased or continued use of these compounds in the categories proposed for regulation could lead to potential adverse environmental impacts. Because of this, ARB staff evaluated this potential to determine if use of these compounds, at the concentrations predicted, could result in adverse public or personal exposures or result in any other potential adverse environmental impact. Staff's analyses follow.

1. Proposed Mitigation Measure to Prohibit Use of Certain Chlorinated TACs

Use of three chlorinated solvents, methylene chloride, perchloroethylene, and trichloroethylene, was reported as currently used in several categories proposed for regulation. In review of reformulation approaches for several other categories staff determined that these compounds, although not currently used, could be used as products reformulate to meet the proposed VOC limits. These chlorinated solvents have been identified as TACs because they are possible or probable human carcinogens.

Two of these TACs, methylene chloride and perchloroethylene, are specifically exempted from the VOC definition (see section 94508a) in recognition of their very low ozone-forming capability. Thus, the potential exists that to meet VOC limits, manufacturers could reformulate using these exempt VOC TACs leading to an adverse impact. Because these two compounds are TACs we are proposing a specific mitigation measure to address their use. While trichloroethylene is regulated as a VOC, such that its use should not increase as products reformulate to meet VOC limits, because it is a TAC we believe a mitigation measure is necessary to ensure that it is not used.

For specific information related to the toxicity of these compounds the reader is referred to the following documents:

- a. Initial Statement of Reasons for the Proposed Airborne Toxic Control Measure for Emissions of Chlorinated Toxic Air Contaminants from Automotive Maintenance and Repair Activities. March 10, 2000. (ARB, 2000).
- b. Initial Statement of Reasons for the Proposed Amendments to the California Aerosol Coating Products, Antiperspirants and Deodorants, and Consumer Products Regulations, Test Method 310, and Airborne Toxic Control Measure for Para-Dichlorobenzene Solid Air Fresheners and Toilet/Urinal Care Products. May 7, 2004. (ARB, 2004b).
- c. Initial Statement of Reasons for the Proposed Amendments to the California Consumer Products Regulations. May 9, 2008. (ARB, 2008a)

In this rulemaking staff is proposing to prohibit the use of methylene chloride, perchloroethylene, and trichloroethylene in Silicone-based Multi-purpose Lubricant, Special-purpose Lubricant, Metal Polish or Cleanser, and Spot Remover products for use on dry clean only fabrics. The proposed prohibitions would be contained in section 94509(m) of the regulation. Implementing this provision would reduce emissions of methylene chloride, perchloroethylene, and trichloroethylene by about 0.1 tons per day and prevent their use in reformulated products.

In each category where we are proposing this prohibition, staff has determined that use of these TAC compounds poses an unnecessary health hazard. Therefore, the proposed prohibitions are necessary to mitigate potential adverse impacts that would result from implementing VOC limits for these categories. The prohibitions would also align with State law that requires use of best available control technology in instances where no safe exposure threshold is known.

Staff also determined that a variety of reformulation technologies exist such that use of these TACs is not necessary in these categories. More detailed information on alternative products and chemicals that can be used to reformulate products such that use of methylene chloride, perchloroethylene, and trichloroethylene is unnecessary is contained in Chapter VII.

The proposed prohibition is a mitigation measure under CEQA (Public Resources Code section 2100 *et seq.*). An alternative basis for the prohibition, however, is the authority granted the ARB to control toxic air contaminants (TACs) under Health and Safety Code section 39665 *et seq.*

2. Proposed Mitigation Measure Related to Greenhouse Gas Emissions

Staff evaluated data for categories for which VOC limits are proposed to determine whether compounds with higher GWP values could be used to reformulate products.

Limited use of the propellant HFC-152a was reported in several categories. Although not reported, staff determined that use of the exempt VOC propellant HFC-134a could occur. A very small amount (less than 1 pound per day) of the exempt VOC HCFC-141b was reported in one category. We have since learned that products containing this compound are no longer sold in California.

Even though it does not appear that use of compounds with high GWPs is necessary or desirable, staff is proposing a mitigation measure in accordance with CEQA to ensure that use of compounds with higher GWP values does not begin as products are reformulated to meet the proposed VOC limits. Specifically a GWP limit of 150 is proposed for Flying Bug Insecticide, Furniture Maintenance Product, Metal Polish or Cleanser, Spot Remover, Special-purpose Lubricant, and Wasp or Hornet Insecticide products. These provisions are proposed in subsection 94509(n).

This limit would not preclude use of HFC-152a, an exempt VOC with a moderate GWP of 140. The proposed limit would prohibit use of HFC-134a which has a GWP value of 1,300.

Staff believes that the VOC limits for these categories are set at a level that does not mandate the use of compounds with GWP values of 150 or greater. Staff also determined that a variety of reformulation technologies exist such that use of compounds with higher GWPs is not necessary in these categories. More detailed information on alternative products and chemicals that can be used as products reformulate is contained in Chapter VII.

3. Proposed Mitigation Measure Related to Use of Alkylphenol Ethoxylates

Staff is also proposing to prohibit the use of certain alkylphenol ethoxylate surfactants in several categories as a CEQA mitigation measure. Alkylphenol ethoxylates are nonionic surface active agents (surfactants) used as wetting agents, emulsifiers, and dispersants in cleaning and degreasing products. One reformulation pathway to meet proposed VOC limits would be to replace VOC solvents with surfactants, such as alkylphenol ethoxylates. Alkylphenol ethoxylates meet the definition of LVP-VOC so their use is not currently restricted by the VOC limits in the Consumer Products Regulation. In the cleaning/degreasing categories, because of how the products are used, some product is washed 'down the drain.' Once into wastewaters, alkylphenol ethoxylates do not readily degrade and they and/or their degradation products enter aquatic environments through wastewater treatment facilities and storm water.

Ample scientific evidence implicates the alkylphenol ethoxylates as toxic to aquatic species. Among other things, they are suspected hormone disruptors, with the primary concern focused on the estrogenic effects of their degradation products (David *et al.*, 2009). In particular, two alkylphenols, octylphenol and nonylphenol, have been shown to mimic the hormone estrogen. In light of this, staff consulted with staff of the State

Water Resources Control Board (SWRCB) to determine if use or increased use of alkylphenol ethoxylates would pose an adverse impact on California's receiving waters.

Information provided to the SWRCB staff indicates that alkylphenol ethoxylates are found in measurable concentrations in the State's receiving waters. Moreover, SWRCB staff is concerned that any potential increased use of alkylphenol ethoxylates could adversely impact aquatic species (SWRCB, 2010a; SWRCB, 2010b; SCCWRP, 2010; and SFEI, 2010). As proposed, after December 31, 2012, use of alkylphenol ethoxylate surfactants would be prohibited from use in General Purpose Cleaner (nonaerosol), General Purpose Degreaser (nonaerosol), Glass Cleaner (nonaerosol), and Oven or Grill Cleaner products. For Heavy-duty Hand Cleaner or Soap (nonaerosol) products the prohibition would become effective December 31, 2013. These prohibitions are proposed to ensure that use of these compounds does not occur as products are reformulated to meet the proposed VOC limits. This proposal would be contained in modified subsection 94509(m)(3).

Staff also finds that replacements for alkylphenol ethoxylates are readily available. Alcohol ethoxylate, linear alkylbenzene sulphonates, and alkyl polyglucosides surfactants are considered to be effective and environmentally safer.

F. Risk Assessment for Implementing the Proposed Amendments

The health risks associated with ozone exposure have been known for many years and are discussed in detail in Chapter IV. Studies have shown that when inhaled, even at relatively low levels, ozone can impact lung tissue and lung function. The greatest risk is to those who are more active outdoors during smoggy periods, such as children, athletes, and outdoor workers. Exposure to levels of ozone above the current ambient air standard leads to lung inflammation and lung tissue damage, and a reduction in the amount of air inhaled into the lungs.

Recent evidence has linked the onset of asthma to exposure to elevated ozone levels in exercising children (McConnell *et al.*, 2002). It has also been shown that ozone exposure is associated with premature death. The actual lowering of health risks that would result from reducing VOC emissions, if the staff's proposal were to be adopted, is not quantified in this report. Qualitatively, however, we are able to conclude that reducing VOC emissions, because of their role as ozone precursors, will result in incremental improvement of the public's health because the reductions represent progress toward attaining both the national and State ozone standards.

As shown in Table IX-1, the proposed amendments are designed to achieve the maximum feasible VOC emission reduction from the categories proposed for regulation at this time. When fully effective, adopting the amendments would result in a VOC emissions reduction of about 6.9 tons per day. Of this amount, 6.7 tons per day would be creditable toward the 2007 SIP while an additional 0.2 tons per day reduction would be credited toward a future SIP commitment. The impacts of our proposal on SOA formation are not clear, although we do not expect a disbenefit.

Prohibition of the use of the chlorinated TAC solvents methylene chloride, perchloroethylene, and trichloroethylene in certain categories would reduce exposure to these potential human carcinogens and further protect public health. The proposed GWP limits are designed to ensure that the emissions of reformulated products do not pose a climate change impact.

The prohibition on use of alkylphenol ethoxylate surfactants should reduce aquatic species' exposure to these known hormone disruptors.

G. Alternative Means of Compliance

Two alternative means of compliance with the Consumer Products Regulation have been adopted. A current compliance alternative for manufacturers of consumer products is the Alternative Control Plan (ACP). The ACP Regulation, title 17, California Code of Regulations, sections 94540-94555, is a voluntary emissions averaging program. This means that a manufacturer may sell some products that exceed the VOC limits in the Regulation as long as those increased emissions were offset by additional products that overcomply with the VOC limits. The ACP provides manufacturers with flexibility, but preserves the overall environmental benefits of emission reductions.

Another compliance alternative that is available for manufacturers is the Innovative Products Provision specified in title 17, California Code of Regulations, section 94511. This provision allows a manufacturer to formulate products that exceed a mass-based limit for a particular product category. The manufacturer must demonstrate that, through some characteristic of the higher VOC product, its use will result in less VOC emissions compared to a representative complying product. This alternative is also specifically designed to allow manufacturers flexibility, while preserving the emission benefits of the Regulation.

Absent use of either of these alternatives, staff is not aware of any additional compliance means, other than direct compliance with the proposed amendments. More information is available in Chapter V of this report.

H. Environmental Justice

State law defines environmental justice as the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies. The ARB is committed to evaluating community impacts of proposed regulations, including environmental justice concerns.

Consumer products are considered area sources and, as such their use is not focused in a particular area leading to a potential "hot spot." Generally, use of consumer products is fairly uniform across the State, tracking with housing units, and their

emissions are spread over the course of a day, rather than concentrated at a particular time of day. For these reasons, we do not believe that people of any given race, culture, or income would be more impacted than any others would. All Californians should benefit equally from the reduction in VOC emissions from the consumer product categories proposed for regulation.

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Chapter X. Future and Ongoing Activities

In this chapter, we describe future and ongoing activities related to the consumer products program. These activities are directed at developing proposals to further reduce volatile organic compounds (VOC), air toxic, and greenhouse gas emissions from consumer products. As always, our rulemaking activities will be conducted using a transparent process, allowing for stakeholder input. Major activities are summarized below.

A. Consumer Product Emissions Reduction Commitments in the State Implementation Plan (SIP)

As described in Chapter III, in the 2007 SIP, the State Strategy for California's 2007 State Implementation Plan, ARB committed to achieving a further 30 to 40 tons per day statewide VOC emission reduction from consumer products by 2014. The amendments proposed in this rulemaking represent the third increment toward achieving the commitment. Table X-1 shows our progress toward meeting the consumer products commitment in the SIP.

Table X-1
Consumer Product VOC Reductions Accredited Toward SIP Commitment

Consumer Products Rulemaking	Statewide VOC Reductions (tons per day)
June 2008 Amendments	4.5 (adopted)
September 2009 Amendments	14.7* (adopted)
2010 Amendments (this proposal)	6.7 (proposed)
Additional Reductions from Consumer Product Categories	~ 4.0 – 14.0
Totals Reductions by January 1, 2014	30 – 40

* Emission reductions of about 12.7 tons per day of this reduction occur in all areas of the State except the South Coast Air Quality Management District (district has their own rule, Rule 1143, for Paint Thinners and Multi-purpose Solvents) (ARB, 2009c).

As shown in Table X-1, adopted amendments will result in 19.2 tons per day toward the commitment. If adopted the amendments proposed here would provide an additional 6.7 tons per day statewide toward the commitment. The remaining commitment would be to achieve at a minimum about 4.0 tons per day by the end of 2013. Proposed amendments to complete the emission reduction commitment will occur in 2011.

Earlier this year U.S. EPA began reconsidering the “primary” ozone standard of 0.075 ppm. To be more health protective U.S. EPA proposed a revised standard in the range of 0.060 to 0.070 ppm (U.S. EPA, 2010c). The final rule is expected in October of this year (2010). The revision will require that a new SIP be drafted in the 2013 timeframe. This SIP will likely require more VOC reductions from consumer products.

B. Consumer and Commercial Products Survey

A survey of various categories of consumer products will be conducted to obtain the necessary data to propose limits to meet the final increment of emission reductions in the 2007 SIP. Among the categories to be included are aerosol coatings, aerosol adhesives, Deodorant Body Sprays, Antiperspirants, Deodorants, Undercoatings (aerosol), hair care products, and sun tanning/block products.

C. Compliance Assistance

Compliance assistance activities in 2011 will include exploring options for identifying complying products destined for sale in California and developing advisories. Advisories will be developed to address questions that have been raised related to provisions in section 94509(b). This subsection specifies how VOC content is determined for concentrated products, but provides an exclusion for “incidental use” of a more concentrated product. The goal of the advisory would be to clarify what constitutes “incidental use.” Additional advisories will be explored to clarify how VOC limits for “general” or “multi-purpose” products are enforced.

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